

**A
COMPARATIVE
HINDU MATERIA MEDICA**

**BY
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tasks are earnestly undertaken, under a national organization, by competent hands and with up-to-date equipment and appliances.

Personally I have labored under a great disadvantage. Having been absent from India for many years, and not having seen many of the plants discussed, this treatise is necessarily more or less based on other people's observations. But I have selected my materials carefully and with caution, and though this compilation may not be entirely free from error, especially in the Bengali and the Hindi names of the botanical species, as I had to describe more than 190 genera and 800 species, I believe it will prove trustworthy and useful to the Indian botanists, herbists, druggists and medical practitioners.

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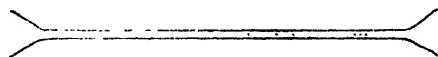
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C. CHAKRABERTY.

A

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INTRODUCTION

The vegetable kingdom is divided into three great groups namely, (1) **Thallophytes**, (2) **Archegoniates** and (3) **Spermophytes**.

The Thallophytes include the lower order of plants. They are simplest in form and structure, and geneologically represent the most primitive types, and they are divided into two groups of plants, known as—(a) **Algæ** and (b) **Fungi**.

Algæ :—*Pleurococcus vulgaris* is the commonest and simplest of one-celled of *Green algæ* that occurs as a green coating on a moist surface, either ground, stone-wall or bark of trees. *Spirogyra* another common *Green Algæ* is seen floating in green masses in ponds and shallow water, and known popularly as *pond-scum*. *Laucheria* another common *Green Algæ*, is seen in shallow water and on moist earth, with branching thallus, and is attached to the substratum by means of delicate

root-like processes (rhizoids). *Diatoms* constitute a large group of unicellular plants, found floating in oceans and lakes in large numbers (plankton) and which is the source of food of small animal forms inhabiting these large fresh or salt waters. Diatomaceous earth, made up of the valves of *diatoms* are used by the Chinese and many other people as an edible earth. Many of the algæ have food value. Quite a few (*Gracilaria*, *Gelidium crinale*) yield agar-agar, and some of the sea-weeds are used in the production of iodine as *Durvillæ utilis*, *Ascophyllum nodosum*, *Fucus vesiculosus* etc.

Fungi :—The *Fungi* unlike the algæ, lack the power of carbon-dioxide assimilation, and therefore are unable to manufacture carbohydrates or chloroplasts. Hence they are compelled to derive their food from living plants, when they are known as *parasitic fungi*, or from decaying animal or vegetable matter and then they are known as *saprophytic fungi*. There are two principal groups of Fungi, namely, (1) **Phycomycetes** or Algæ-fungi and (2) **Eumycetes** or true-fungi. The Eumycetes are again subdivided into (a) Ascomycetes and (b) Basidiomycetes. **Phycomycetes** :—*Saprolegnia* is a common water-mold, aquatic in its habit, both parasitic and saprophytic, occurring on living fish, insects, cray-fish, and decaying plants and animals : *Peronospora*, one of the Oomycetes, known as *downy mildews* occur on the leaves of many cultivated plants and herbs as potato, tobacco, grape vine, lima bean, aconite, hyoscyamus, etc., and are very destructive ; *Mucor mucedo* or *black mold* is widely distributed, spoiling many sugar and starch-containing substances as fruit-preserve, jelly or marmalade, and a number

of the *Mucor* species possesses the power of inducing alcoholic fermentation in glucose-containing solution.

Ascomycetes : *Saccharomyces* or *yeasts* are the simplest of the Ascomycetes, and for their behavior or changing carbohydrates in part into carbon dioxide and alcohol, they are of special economic importance in the making of bread and alcoholic fermentation ; *Penicillium* and *Aspergillus* (green and yellow Mildews) are very common in the dairy and the granary ; *Ergot* (*claviceps purpurea*) germinates on certain grasses, and from which, it is usually carried to the rye plants, where it is developed into ergot grain. The basidiomycetes are the most highly developed *fungi* and are known as mushrooms, toadstools and puffballs, characterised by spores on the special hyphæ ; some of the mushrooms (*Agaricus compestris*) are edible while others (*Amanita phalloides*) are poisonous, containing the deadly toxic principles *Amanita-toxin* and *muscarine*.

Lichen is a composite organism, consisting of an ascomycetous fungus, living symbiotically with an algæ, the hypæ of the fungus enveloping the algal cells (gonidia) and deriving organized food-materials from them, while in turn the algæ are protected from external injury. Lichens are perennial ; they grow very slowly, and attain an extreme age, and some are supposed to have lived more than a thousand years on ancient rocks. According to the manner of growth and the manner of attachment to the substratum, the Lichens are divided into three principal groups, namely—
(1) Crustaceous Lichens, where the thallus adheres closely to the stones and barks of trees and practically can not be removed without injury ; (2) Foliose Lichens.

which are more or less flattened, somewhat leaf-like and attached at different points ; (3) Fructicose Lichens which are attached to a particular part of the thallus and form diffusely branching clumps, and to this group belongs the variety of Iceland moss (*cetraria islandica*).

Archegoniates differ from the Thallophytes in the structure of the sexual organs which are characterized by multicellular differentiation, and the peculiar phases of alternation of generations—sexual and asexual, that take place. In some of the archegoniates, these two phases are combined as in *Bryophytes*, where as in other members of the group, the gametophyte and sporophyte become independent of each other and are represented by two distinct plants as in *Pteridophytes*. *Bryophytes* Hepoticæ (Liverworts) are usually found in the moist situation, and are subdivided into three groups, namely—(1) *Marchantia*, in which the thallus is differentiated into several layers and hence somewhat thickened ; (2) *Jungermania* are those forms which are more or less moss-like and develop stems and small leaves ; (3) *Anthoceros* in which the gametophyte is simple in structure and the sexual organ is embedded in the thallus. Mosses (*Musci*) may be monoecious, having one sexual organ or dioecious, having both, which are surrounded by leaf-like structure—perichetia ; and they are divided into two groups—(a) *Sphagnum* which produce leaves without nerves, and (b) the True Mosses which not only produce the stalk, but also the peristome. *Pteridophytes* : the *Pteridophytes* include three principal groups, namely—(1) *Filicales* (Ferns), (2) *Equisetales* (Horsetails) and (3) *Lycopodiales* (Club Mosses). Ferns (*Filicales*) vary in size from ground-stem to plants several feet high

as the several species of Tree Ferns as *Osmunda*, *Aspidium* ; Water Ferns (*Salvinia*) are aquatic in habit and live in marshy places or float in shallow water. The Horsetails (*Equisatales*) are perennial plants, containing a large amount of silicon in their tissues, are like the ferns, more or less branching, but the creeping rhizome persists from year to year, sending out each year new shoots. The Club Mosses (*Lycopodiales*) are prennial moss-like plants with more or less erect or creeping or branching stems on which are borne numerous simple leaves ; *Isoetes* (quillworts) belonging to this group, is a marsh plant, with a number of filiform roots which penetrate the mud, and compact rush-like leaves.

Spermophytes (Seed Plants) constitute the most important division of the plant kingdom. They supply man and other animals with a large part of the food, shelter and various necessities of life. And they are divided into two groups (1) *Gymnosperms* and (2) *Angiosperms*.

Gymnosperms :—*Gymnospermæ* (*gymnos*=naked + *sperma*=seed) are phylogenetically lower in the scale of evolution. They represent an ancient group of plants, and were more numerous during the Triassic period than now, including the fossil orders *Bennettitales* and *Cordaitales*, and the living orders *Cycadales* (Fern Palms), *Ginkgoales* (*Ginko biloba*, confined only in China and Japan), *Gnetales* (Fir family) and the *Pinales* (*Coniferæ* : pines, hemlocks, balasams, arbor vitæ, junipers and cedars). They are distinguished unlike the *Angiosperms*, having their ovules, each of which contains a megasporangium borne on an open sporophyll (carpel).

and thus exposed as well as the seeds developed from them, and they do not shed their leaves periodically and are therefore known as *evergreens*.

Angiosperms :—The Angiospermæ are particularly distinguished from the Gymnospermæ by having their seeds developed in a closed carpel. The carpel (megasporephil) evolves into an organ, known as *pistil* consisting of three parts, namely, *ovary*, *style* and *stigma* and the ovary enclosing the *ovules*. The embryo-sac (megaspore) develops a gametophyte which does not give rise to archegonia, but the egg arises directly from the megaspore nucleus by a series of divisions. The stamen (microsporophyll) also differs considerably in structure and appearance from that of the Gymnosperms. The stamen may be defined as a leaf which bears *sporangia* (spore cases), differentiated into two parts—filament and another, the latter consisting of pollen sacs (microsporangia) in which the pollen grains (microspores) are developed. In a large number of cases in the Angiosperms, there is developed in addition to the sporophylls or sporangial leaves (stamens and pistils) another series of floral leaves—sepals and petals, thus forming an attractive envelope (flower), to the insects which are attracted to it by bright color, aroma and honey, and thus by the insect agency fertilization is facilitated, while in gymnosperms, the winged pollens are carried by the wind.

It is therefore evident that the Angiosperms are further in the stage of evolution. And they have shown remarkable adaptability. From the pole to the equator, they are found every where. Quite a few of them have even invaded the water-area, and are found in swampy places and shallow river-beds. From the tiny *stramonium*

which finishes its life-work in a few weeks; it ranges to giant *Red-wood tree* of California which lives nearly ten thousand years or the wide-branching *Banyan-tree* (*Ficus bengalensis*), which is known to have sheltered more than seven thousand soldiers under its canopy. Between these two extremes, there is every conceivable gradation, creeping, climbing or erect shrub or tree. This wide expansion of the Angiosperms has been possible for its bright and colourful flowers which attract insects for their perfume and honey, and thus enhance the chance of fertilization, as well the development of the luscious fruit-pulp, which the birds enjoy to feed upon, and carry and distribute the seeds to far and distant places. The economic importance of Angiosperms is immeasurable, for all our cereals—rice, wheat, corn, etc., legumes, garden vegetables, edible fruits, textile products as cotton and flax, majority of medicinal herbs and timbers of various kinds, are supplied by them. Angiosperms are divided into two main groups—*Monocotyledons* in case a single cotyledon (seed-leaf) is formed in the embryological development of the seed, and *Dicotyledons* in case two cotyledons arise laterally opposite each other, or more cotyledons grouped together.

MONOCOTYLEDONS.

I. Order Graminales or Glumifloræ is composed of two families:—*Gramineæ* (grasses) and *Cyperaceæ* (sedges). The grasses comprise about 3500 species and are distributed in all parts of the world. The plants of this family are nearly all herbs, having cylindric, generally hollow culms with swollen nodes. The *Oryzæ* tribe to which the rice (*Oryza sativa*) belongs has 16 genera.

The *Hordea* tribe to which the wheat (*Triticum sativum*) and barley (*Hordeum sativum*) belong has 19 genera. The *Bambuseæ* tribe to which the tallest member of the family with woody silicious stems with numerous branches—the bamboo, mainly tropical, belongs, has 23 genera. *Cyperaceæ* or sedge family comprises about 1000 species of which *Cyperus esculentus* and *Eleocharus* are utilized for the manufacture of starch from the rhizomes, and *Cyperus pertenuis* is used for colic, and yields an ethereal oil which is used in making perfumery. The members of the *Cyperaceæ* family are all herbacious, but mostly perennial plants, with sympodial rhizomes, solid stem without nodes, but the leaves are grass-like, generally arranged in three rows with closed sheath and without ligules.

II. *Phœnicaceæ* or Palm family, comprising about 135 genera and 1100 species, all tropical, marked commonly by a simple unbranched stem (trunk), terminal crown of leaves, pinnate (feather plams) or palmate (fan palms) in the axils of which perfect or polygameous spadiceous flowers are produced.

III. *Arales* included two families :—*Araceæ* and *Lemnaaceæ*, and the former is regarded by many botanists as the degenerate branch of the latter. (a) *Araceæ* or *Arum* family, chiefly of tropical distribution, are perennial herbs, with an inflorescence in a fleshy spike or spadix, sustended or enclosed by a leafy bract (spathe) as in the *Calla-lily*, and which are characterized by tuberous or fleshy rhizomes, simple or compound, usually long-petioled leaves, embracing more than 100 genera and 900 species. (b) *Lemnaceæ* or *Duckweeds* family, are free-floating aquatic plants, consisting of a single flat or thickened

frond bearing root or roots below, and one or two naked monœcious flowers on the edge or center of the upper surface, comprising of three genera—*Lemna*, *Wolffia* and *Spirodela*.

IV. Xyridales are perennial herbs of tropical America, with basal, equitant, usually distichous leaves and leafless scapes, bearing flowers in the axils of the imbricated scales, comprising of 11 families, to one of which—*Bromeliaceæ*, the pineapple (*Ananas sativus*) belongs.

V. Liliales or Lilifloræ are perennial herbs, with parallel-veined leaves, rhizomes, tubers, bulbs or fibrous roots, comprising 11 families of which the most important are the *Liliaceæ*, *Amaryllidaceæ*, *Iridaceæ* and *Dioscoreaceæ*, characterized by the complete trimerous or hexamerous flowers and the compound ovary. (a) *Liliaceæ* or Lily family embraces many ornamental plants whose flowers are symmetrical, anthers are intorse, the perianth is parted into six more or less distinct segments, and are characterized by the loculicidal capsular fruit and the usually bulbous base of the stem. (b) *Amaryllidaceæ* or *Amaryllus* family embraces about 70 genera and 800 species, growing in the hot and arid regions of America, with often very handsome flowers, with the tube of the perianth adnate to the ovary, and of them the *Agave* (*Agave americana*) is a very useful plant, its exudation contains saponin and is used as a medicine, its milky juice is fermented and made into the national beverage (pulque) of the Mexicans, and its fibers are used as weaving materials and are known as *Sisal hemp*. (c) *Iridaceæ* or *Iris* family contains about 60 genera and 900 species, which are perennial herbs of wide distribution

with bilateral leaves, bracted and often showy flowers of petaloid stigma and hexamerous perianth in two series.

(*d*) Dioscoreaceæ or Yam family comprises of 9 genera and about 175 species, natives chiefly of tropical America, and which are twining herbs or shrubs, with netted-veined leaves, small diœcious flowers and tubers either above or below ground.

VI. Scitaminales are mostly tropical perennial herbs, with fleshy rhizomes, large, more or less elliptical and pinnately-veined leaves, epigynous, unsymmetrical or zygomorphic flowers, and the leaf-sheathes close tightly round each other, and form a kind of false stem, and they embrace many important families of which Zinziberaceæ, Musaceæ, Cannaceæ and Marantaceæ are very important. (*a*) Zinziberaceæ or Ginger family comprises 24 genera and about 275 species, mostly tropical Asiatic and Polynesian perennial herbs, and are distinguished from the other Scitamineæ by the fact that the seeds have endosperm as well as the perisperm, and as these plants are rich in volatile oils and aromatic root-stocks, many of them, especially Zinziber (ginger), *Elettaria Cardamomum* (cardamon), *Curcuma* (turmeric) are used as condiments and medicine. (*b*) Musaceæ embraces 4 genera :—*Musa*, *Strlitzia*, *Ravenala* and *Heliconia*, and about 40 species, which are succulent tree-like gigantic perennial herbs, characterized by brightly coloured spathaceous bracts, a perianth of two series, both of which are petaloid, five anthers with one staminode and baccate or capsular fruits, and to this family the savory and nutritious Banana (*Musa paradisiaca*, *Musa sapientum*) belongs. (*c*) To the Cannaceæ, belongs the cultivated *Canna* in West Indes and Australia as vegetable.

and *Canna coccina* in Central and South America for the arrow-root starch. (*a*) *Marantaceæ* includes about 12 genera and 150 species, natives of tropical America which are cultivated for the supply of the *Maranta* arrowroot from their tuberous starchy roots, as well for their handsome foliage.

VII. Orchidales includes two families—*Orchidaceæ* and *Burmaniaceæ*. (*a*) *Orchidaceæ* embraces about 415 genera and 5000 species, mostly in the tropics, are characterized by entire sheathing leaves, sometimes reduced to scales, and usually showy flowers of remarkable structure, the calyx consisting of three often petaloid sepals, the corolla of the petals differing from each other, and the fertile stamen is variously united with the gynœcium into a column; the orchids are perennial epiphytic or terrestrial plants, and are the most highly specialized and developed of the *Monocotyledons*. *Vanilla* is obtained from one of them—*Vanilla planifolia*, and the root-stocks of a number of them are rich in mucilage, yielding salep. (*b*) *Burmaniaceæ* includes 10 genera and about 60 species, and are characterised by basal or bract-like leaves and small regular perfect flowers.

CLASS DICOTYLEDONS.

The **Dicotyledons** are characterized by the following peculiarities : (*a*) The leaves are reticulately (open) veined and usually with an irregular margin, being sometimes deeply lobed ; (*b*) the parts of the flower are usually in circles of 2 to 5 each ; (*c*) the stems and the roots generally increase in thickness by means of a cambium, vascular bundles are open, and the annular rings are formed in the perennial stems ; (*d*) the germinal plants have usually two.

cotyledons (seed-leaves) which are opposite each other, and which are the special distinguishing marks of Dicotyledons. The Dicotyledons are divided into two sub-classes :—Archichlamydeæ and Metachlamydeæ, depending upon whether the parts of the corolla are distinct or united.

SUB-CLASS ARCHICHLAMYDEÆ.

The **Archichlamydeæ** or **Choripetalæ** comprise those dicotyledonous plants in which the petals are separate and distinct from each or are in rudimentary formation.

I. Order Piperales include the families Piperaceæ, Saururaceæ, Chloranthaceæ and Lacistemaceæ, mostly tropical perennial herbs or climbing shrubs, having simple leaves and minute naked or homochlamydeous flowers in spikes, and of which only the first family is of economic and medicinal importance. Piperaceæ or Pepper family embraces 9 genera and 1000 species of which the *Piper* and *Peperomia* are significant. The genus *Piper* supplies the *Piper nigrum*, *Piper cubeba* of commerce, and *Piper betle* or *Charvica betle* whose leaves are chewed in India and Malaysia with Areca nut, a mixture of quick-lime and aromatics, as an astringent mouth anticeptic, a mild aphrodisiac, and a mustactory and digestive stimulant.

II. The Order Salicales comprises but a single family—Salicacæ, consisting of two genera—*Salix* (willows) and *Populus* (poplars) which are dioecious plants, characterized by flowers being in aments or catkins and without petals or sepals, and the fruit being a capsule containing many seeds which are small and with long silky-hairs at the base.

III. Myriacales is chiefly composed of Myriacaceæ,

(Bayberry family) comprising 2 genera—*Myrica* and *Comptonia*, aromatic shrubs, characterized by coriaceous leaves, small pistillate declinuous flowers borne aments in the axils of bracts, and small drupe or nut-fruits.

IV. Juglandales embraces but one family—*Juglandaceæ* (Walnut family) comprising six genera, *Juglans* (walnut) and *Hicoria* (hickory) being the most important, characterized by alternate, pinnately-compound leaves, staminate hexamerous flowers in drooping aments, and fibrous nut.

V. Fagales includes two families—*Fagaceæ* and *Betulaceæ*, which are trees with alternate, petiolate, pinnately-veined leaves, monœchious, declinuous flowers in aments. (a) *Fagaceæ* or Beech family have 5 genera and about 400 species, characterized by one-seeded nuts. (b) *Betulaceæ* or Birch family comprises six genera and 75 species of wide distribution and the nuts of some species (*Corylus colurna* yields hazelnut) are edible.

VI. Urticales includes *Urticaceæ*, *Ulmaceæ* and *Moraceæ*, characterized mainly by the free perianth. (a) *Urticaceæ* (Nettle family) comprises 40 genera and 475 species, characterized by polygameous apetalous flowers, the fruit being an achene. (b) *Ulmaceæ* (Elm family) comprises 13 genera and 140 species, distinguished by alternate stipulate leaves, small apetalous perfect or unisexual flowers. (c) *Moraceæ* (Mulberry family) contains 55 genera and 900 species of wide distribution, of which nearly 600 being comprised in the single genus *Ficus*, and the other important genera being *Morus* (mulberry), *Cannabis* (hemp), *Artocarpus* (bread-fruit), *Brosimum* (bread-nut), and which are all natives of the tropics and the sub-tropics, as herbs, shrubs or trees, having a milky

juice (latex) and small diclinous apetalous flowers and unicellular ovary.

VII. Proteales is represented by a single family—*Proteaceæ*, comprising 50 genera and about 1000 species, natives of Australia and South Africa, having coriaceous leaves, and beautifully-coloured, clustered, bracteate flowers in crowded inflorescences, with 4 valvate calyx lobes and 4 stamens with longitudinally dehiscent anthers.

VIII. Santales embraces three families, all of which are all parasitic or half parasitic, and are distinguished by a 1-celled inferior ovary. (a) *Santalaceæ* (Sandal wood family) comprise 26 genera and 250 species, most of them being root-parasites, and of which genus *Santalum*—a tree with coriaceous leaves, small perfect flowers in terminal panicles, 4-lobed perianth, adnate at base to the ovary, is important, as its wood supplies the volatile sandal oil. (b) *Loranthaceæ* (Mistletoe family) comprising about 13 genera and over 500 species, are parasitic, yellowish-green plants, living by means of haustoria on oaks, elms, red maple and other deciduous trees, and they are characterized by small apetalous flowers with a 1-celled inferior ovary, and their white globose berries are quite poisonous, having the volatile alkaloid and glucoside *viscine*. (c) *Balanophoraceæ*, comprising 14 genera, are mostly monotypic root-parasitic plants, red or yellow in color, being destitute of chlorophyll, and yield a waxy resin.

IX. Aristolochiales embraces three families, *Aristolochiaceæ*, *Rafflesiaceæ* and *Hydnoraceæ*, distinguished by the tubular perianth. (a) *Aristolochiaceæ* (Birthwort family), comprising 5 genera and about 200 species are tropical erect or climbing herbs or shrubs, having alternate

petioled leaves and apetalous flowers, the calyx mostly corolla-like. (b) *Rafflesiaceæ* comprising 7 genera and 25 species, are tropical endotropic parasitical herbs, devoid of chlorophyll, stems or leaves, in place of which there are imbricated scale and mushroom-like apetalous huge flower, with 5-10 calyx lobes, at the cost of the host, and usually exaling a carion-like odor. (c) *Hydnoraceæ* comprising two genera, is a root parasite, consisting of branched fungus-like, chiefly subterranean growth, sending up large succulent flower on the surface.

X. Polygonales (Buckwheat family), is represented by a single family—*Polygonaceæ* comprising 30 genera and nearly 800 species, chiefly of the north temperate zone, are herbs, shrubs and trees, with stipules forming a sheath (ocrea) round the stem, and the flowers are spicate, without an involucre, the calyx corolla-like and the pedicles jointed.

XI. Chenopodiales includes ten families of which the most important are *Chenopodiaceæ*, *Amaranthaceæ* and *Silenaceæ*, but in all of them the embryo is curved or coiled, and the reserve consists chiefly of perisperm. (a) *Chenopodiaceæ* (Goosefoot family) comprising 75 genera and 550 species of wide distribution, chiefly in saline or alkaline regions, are annual or perennial herbs, and are distinguished by urticular fruit. (b) *Amaranthaceæ*, are weed-like plants with fasciated inflorescence and utricular fruits, and they are popularly known as *love-lies-bleeding* (*Amaranthus Caudatus*). (c) *Silenaceæ* (Pink family) comprising 70 genera and 1500 species, are annual herbs, distinguished by their stems being usually swollen at the joints, opposite leaves, regular,

mostly obdiplostemonous flowers, with a superior ovary, having a free central placenta.

- XII. Ranunculales** consists of 16 families, distinguished in general by the acyclic or hemi-cyclic flowers with numerous stamens and apocarpous ovary.
- (a) **Ranunculaceæ** (Crowfoot family) include 35 genera and over 1000 species of wide distribution, distinguished by the acrid juice, usually alternate leaves, and regular or irregular flowers with hypogynous stamens.
- (b) **Magnoliaceæ** (Magnolia family) comprising 13 genera and nearly 100 species, are shrubs or trees of wide distribution, distinguished by large and showy flowers with indefinite petals and stamens, and the elongated receptacle bears extrose carpels with exalbuminous seeds.
- (c) **Nymphæaceæ** (Water-lily family) comprising 8 genera and about 35 species, are long-stalked aquatic plants distinguished by pelatate leaves and large flowers with 3-5 sepals, numerous petals and stamens, and polycarpellary indehiscent fruit. Though this family is classed as polypetalous dicotyledons, structurally, these plants have only one cotyledon, which indicates that they belong to monocotyledonous Naiadales order.
- (d) **Menispermaceæ** (Moonseed family) comprising about 60 genera and 350 species, are climbing or twining, herbaceous or woody vines, distinguished by small 3-parted dicecious flowers and curved embryo.
- (e) **Myristicaceæ** (Nutmeg family) is represented by a single genus *Myristica* with a large species of tropical distribution, characterized by having their entire leaves and small white or yellow flowers succeeded by fleshy fruits with a hard seed enclosed in a colored arillode.
- (f) **Annonaceæ** (Custard-apple family) comprising 50

genera and 550 species, are mostly tropical shrubs or small trees, characterized by alternate leaves, flowers with 3 sepals and 6 petals, and fleshy fruits, many of which are edible as the custard apple (*Anona*) and the papaw (*Asimina*).

XIII. Papaverales comprising 6 families, are herbaceous plants, distinguished by the regular cyclic flowers with hypogynous stamens and superior compound ovary. (a) *Papaveraceæ* (Poppy family) comprising 26 genera and about 200 species, are annual herbs with a milky or colored latex, flowers with cadulous sepals and hypogynous stamens and capsular fruit. *Papaver somniferum* is the source of opium. (b) *Brassicaceæ* (Cabbage, mustard and cress family) comprising about 185 genera and 1500 species, of wide distribution, are easily recognized by the cruciate 4-merous flowers with tetradynamous stamens and by the fruit which is a silique or silicle, possessing an acrid or pungent watery juice, among which *Sinapis* (the white mustard), *Brassica* (cabbage, turnip, etc.), *Raphanus* (radish) may be mentioned.

XIV. Sarraceniales consist of three families, which are all distinguished by the peculiar construction of the leaves, adapted to the catching and digestion of insects. (a) *Sarraceniaceæ* (American pitcher-plant family) comprising of three genera, are American bog herbs, distinguished by having pitcher-shaped leaves, the inner margin of which is covered with a thin winglike lamina (purea), the apex with a hood, to catch the insects when they light upon them, enticed by the large and conspicuous 5-merous flowers, and the insects are digested in the watery fluid which the pitchers

contain. (*b*) *Nepenthaceæ* contain but a single genus—*Nepenthes*, comprising 30 species which are Malaysian climbing plants, which are characterized by having their leaves with midrib prolonged to a tendril, the apex expanding in a pitcherlike appendage (monkey-cups), closed by a lid, secreting an acid liquid that aids in the digestion of the insect-protein accumulated at the bottom. (*c*) *Droseraceæ* (Sundew family) comprising 6 genera and about 125 species, of wide distribution, are insectivorous plants.

XV. *Rosales* embrace 16 families, ranging from herbs to shrubs and trees, and are distinguished by the perigynous or epigynous stamens and having the sepals mostly confluent with the calyx tube. (*a*) *Rosaceæ* (Rose family) comprising about 65 genera and 1200 species, are shrubs or trees, usually with alternate, stipulate, simple or compound leaves, pentamerous flowers with the carpels usually numerous and distinct, becoming achenes or follicles in fruit. Genus *Rosa* (Rose) is reputed to have 30 species and 4000 cultivated sub-species, with a great range of variation, the petals not only showing a wide diversification in size, shape, color and fragrance, but also in number, doubling or trebling from the wild pentamerous (five-petalled) condition. In Upper and North India *Rosa damascena* and *Rosa moschata* are cultivated for supplying the *attar* of rose. *Prunus domestica* (prune), *Pyrus malus* (apple), *Pyrus communis* (pear), *Cydonia vulgaris* (quince), *Rubus nigrobaccus* (blackberry), *Rubus idaeus* (raspberry), *Prunus serotina* (cherry) are cultivated for their luscious fruits, but *Pyrus glabra* is cultivated in Persia for its aromatic manna. *Prunus amygdalus* yields almonds. (*b*) *Leguminosæ* (Pulse

family) are now divided by many botanists into three sub-groups, ranking as families. Fabaceæ or Papilionacæ embrace an immense family of plants, comprising about 320 genera and 5000 species of wide distribution and of great economic importance, and they are distinguished by butter-fly-like (papilionaceous) flower and the fruit is a true pod or legume. The seeds of many of them are rich in protein and used as food as pea (*Pisum sativum*), bean (*Phaseolus vulgaris*), lentil (*Lens esculenta*), soy-bean (*Glycine hispida*). Caesalpinoideæ include the serinas (*Cassia angustifolia*). Mimosoideæ include the acacias.

XVI. Geraniales embraces ten families, and are characterized by pendulous ovules. (a) Geraniaceæ (Geranium family) comprising 11 genera and about 350 species, are perennial herbs, distinguished by the dissected foliage, regular and perfect flowers and the fruit splitting at length into 5 carpels. (b) Oxalidaceæ (Sorrel family) comprising 7 genera and about 270 species, are herbs of wide distribution, distinguished by having compound leaves, regular pentamerous flowers with 10-15 stamens, and the leaves containing oxalic acid and acid oxalates. (c) Linaceæ (Flax family) comprising 4 genera and 150 species of wide distribution, are distinguished by regular pentamerous flowers with 2-5 celled capsule. (d) Rutaceæ (Rue family) consist of 111 genera including *Citrus* and nearly 800 species, mostly tropical or sub-tropical, are shrubs or trees, distinguished by tetramerous or pentamerous flowers with four or five distinct or somewhat united carpels, strong scent and lysigenous oil-secretion cells. Other families are Burseraceæ (Myrrh family), Meliaceæ

(Mahogany family), Polygalaceæ (Milkwort family), Euphorbiaceæ (Spruce family), Simarubaceæ (Ailanthus family), Erythroxylaceæ (Coca family) and Zygophyllaceæ (Caltrop family).

XVII. Sapindales embrace Coriariaceæ, Buaceæ (Box tree family), Anacardiaceæ (Sumac family), Aquifoliaceæ (Holly family), Celastraceæ (Staff-tree family), Aceraceæ (Maple family), Hippocastanceæ (Buckeye family), Sapindaceæ (Soapberry family), Balsaminaceæ (Jewel-weed family), which are chiefly trees and are distinguished by regular flowers and the seeds usually without endosperm.

XVIII. Rhamnales Rhamnaceæ (Buckthorn family) and Vitaceæ (Grape family), characterized by having 4 or 5 stamens which are either with the sepals or opposite the petals, and atropous ovules.

XIX. Malvales embraces Elaeocarpaceæ, Tiliaceæ (Linden family), Malvaceæ (Mallow family), Bombaceæ, Sterculiaceæ, (Cola family), and are distinguished by their having numerous stamens, valvate sepals and axillary placentas.

XX. Parietales embraces Dilleniaceæ, Marcgraviaceæ, Theaceæ (Tea family), Guttifera (Gamboge family), Hypericaceæ, Dipterocarpaceæ, Tamparicaceæ, Bixaceæ, Winteraceæ, Violaceæ (Violet family), Flacourtiaceæ, Turneraceæ, Passifloraceæ (Passion flower family), Caricaceæ (Papaw family), Begoniaceæ and Datisceæ—which are natives of the tropics, and are distinguished by the flowers having ovaries with the parietal placentas.

XXI. Opuntiales consists of the American Cactaceæ or Cactus family, comprising 20 genera and over 1000 species—which are succulent plants growing largely in the

arid regions, characterized by having their stem terete or tuberculated, scaly leaves, the axils of which are covered with hairs or spines, solitary, sessile, regular and conspicuous flower and fleshy berry as fruit, which is edible in some species.

XXII. Myrtales embraces Thymelæceæ (Metzereum family), Elæagnaceæ, Lythraceæ (Loosestrife family), Punicaceæ (Pomegranate family), Lecythidaceæ, Rhizophoraceæ (Mangrove family), Myrtaceæ (Myrtle family), Combretaceæ, Melastomaceæ, Onagraceæ (Evening Primrose family) and Hydrocaryaceæ—which are herbs or shrubs of wide distribution, and are distinguished by having complete flowers, rarely apetalous, producing one or more ovules in each loculus.

XXIII. Umbellales embraces Araliaceæ (Ginseng family), Umbelliferæ (carrot family) including *Coriandrum sativum*, *Carum Carvi*, *Anisum*, *Phoeniculum*, *Apium* (celery), *Pastinaca* (parsnip), *Daucus* (carrot), having about 175 genera and 1500 species, distinguished by dry, seed-like fruit, composed of two carpels, known as mericarps; this family is also called Apiaceæ, Cornaceæ (Dogwood family)—which are of wide distribution, and are distinguished by umbellate flowers and inferior ovary with one ovule in each cavity.

B. METACHLAMYDEÆ.

Metachlamydeæ embraces the most advanced group of plants, classified in seven orders, distinguished by the following characteristics: The corolla is sympetalous; the flowers are mostly perigynous or epigynous, and both the corolla and the stamens are borne on the perianth

tube ; the number of parts is definite, there being 5 sepals, 5 petals, 5 or 10 stamens and 2 or 5 carpels.

I. Ericales consists of Ericaceæ (Heath family), Pyrolaceæ, marked by having the stamens free from the perianth tube.

II. Ebenales consists of Ebenaceæ (Ebony family), Sapotaceæ (Sapodilla family) and Styraceæ (Storax family)—which are natives of the tropics, distinguished by alternate leaves, and the fruit being a berry or drupe.

III. Gentinales embraces Gentianaceæ (Gentian family), Oleaceæ (Olive family), Loganiaceæ (Logonia family), Apocynaceæ (Dogbrane family) and Asclepiadaceæ (Milkweed family)—which are plants of tropical and sub-tropical habitat, and are distinguished by opposite leaves, regular flowers, and the gynaecium consisting of two separate carpels.

IV. Polemoniales or Tubifloræ consists of Convolvulaceæ (morning-glory family), Verbenaceæ (Varvain family), Labiateæ (Mint family), Solanaceæ (Potato family), Scrophulariaceæ (Figwort family), Bignoniaceæ (Trumpet-creeper family), Pedaliaceæ, Acanthaceæ (Acanthus family), Plantaginaceæ (Plantago family)—which are herbacious plants of wide distribution, and are characterized by opposite or alternate leaves, regular flowers, the stamens being usually adnate to the corolla.

V. Rubiales embrace Rubiaceæ (Madder family, to which Cinchona species [30 to 40] from whose bark quinine is derived, belong), Caprifoliaceæ (Honeysuckle family), which tropical plants, distinguished by having opposite or verticillate leaves and distinctly epigynous flowers.

VI. Valerianales or *Aggregatæ* embrace *Valerianaceæ* (Valerian family), *Dipsacaceæ* (Teasel family)—which are mostly herbs with an inferior ovary, either unilocular with a single pendulous ovule, or tri-locular with only a single anatropous ovule.

VII. Campanulatæ embrace *Campanulaceæ* (Bell-flower family, characterized by having flower with five stamens and the capsular or berry fruit, containing numerous small seeds), *Cucurbitaceæ* (Gourd family comprising 90 genera and 700 species of tendril-climbing or trailing annual tropical vines, characterized by monadelphous anthers) *Compositæ* (comprising more than 10,000 species of annual, biennial or perennial herbs, climbers, twiners shrubs or trees, by having the small flowers or florets in dense involucrate heads resembling single flower in which there are five stamens, but the anthers only are united and the filaments remain separate as the daisy, dandelion, aster, golden-rod (*Solidago canadensis*), sunflower (*Helianthus annuus*), Jerusalem Artichoke (*Helianthus tuberosus*), chrysanthemum (*Chrysanthemum sinense japonicum*), marigold (*Calendula officinalis*)—which are plants of wide distribution, and are distinguished by having their anthers united into a syngenesious tube.

India enjoys a cosmopolitan flora. In the upper Western Himalayas, there is an admixture of European species, such as *Aquilegia* (columbine) *Quercus ilex* (holm oak), *Crataegus oxyacantha* (hawthorn) and many members of the *Coniferæ* and *Betulaceæ* (Birch family); altogether there are 570 European genera and 760 species, indigenous in India. Possibly the Indian *Cedrus deodara* is the adaptation of the Mediterranean cedar (the cedar of

Lebanon of the Bible). In the Eastern Himalayas and Assam the Chinese species *Magnolia*, *Aucuba*, *Abelia*, *Skimmia*, *Thea sinensis* (tea) are usually met. The arid North African species are represented in Beluchistan, Sind and the Punjab by quite a few species as *Capparis aphylla*, *Acacia arabica*, *Populus euphratica*, *Salvadora persica*, *Zyzyphus*, *Tamarix mannifera*, *Nymphaea* (lotus). In the Western Ghats, there are many representative species of Central and South Africa as *Grewia*, *Impatiens*, *Sida*, *Indigofera*. There are numerous Malayan genera in Assam, East Bengal and Eastern Ghats up to the Malabar coast. The Australian genera are also well represented by *Baeckea*, *Leptospermum*, *Melaleuca*, *Leucopogon*, *Stilidium*, *Helicia* and *Casuarina*. A North American species is represented by *Oxybaphus himalaicus*. The botanical distribution also corroborates the geological hypothesis, that Eastern India was connected with America by a continent, which is now submerged, and the sunken continent is now represented by the mountain tops, as the Easter Islands, Japan, Philipines, Pacific Islands, Australia and Java, which region is also known as the *volcanic belt* or *the circle of fire*; South India was connected with South Africa and South America.

The number of species indigenous in India may be estimated to be about 20,000, of which nearly 16,000 are Flowering plants under 174 Natural Orders, and about 600 species of Ferns. They may be divided principally into four groups, according to altitude, moisture, aridity, and the admixture of the foreign genera, South African in Malabar, European in western Himalayas, North African in Sind, Indus and the Gangestic regions and Malaysian in the Bengal coast.

I. Malabar Region : The Malabar region is the meeting ground of three widely distributed botanical flora, the South African, Peninsular, and the Malayan which is richly represented by Sterculiaceæ, Tiliaceæ, Piperaceæ, Scitamineæ, Anacardiaceæ, Meliaceæ, Myrtaceæ, Melastomaceæ, Ampelideæ, Gesneraceæ, Orchideæ and Aroideæ. In the whole Western Peninsula, upwards of 4000 species of flowering plants, under 150 Natural Orders have been calculated in the following sequence : Gramineæ, Leguminosæ, Acanthaceæ, Orchideæ, Cyperaceæ, Euphorbiaceæ, Rubiaceæ, Compositæ, Labiatæ, Asclepiadeæ, etc., the proportion of Monocotyledons to Dicotyledons being about 1 : 2. 7. and of Genera to Species 1 : 3. 3. The Malabar flora is, however, characterized from that of the Deccan, by having 27 species of Bambuseæ, 13 species of Guttiferæ, 21 species of Palmæ, and the genus *Helicia* which is also found in Australia and Japan, as well as the Malaysian genera.

II. The Western Himalayan Region : In the Western Himalayas, nearly 4000 flowering plants have been recorded, under 147 Orders, in the following sequence : Gramineæ, Compositæ, Leguminosæ, Cyperaceæ, Labiatæ, Ranunculaceæ, Orchideæ, etc., the proportion of Monocotyledons to Dicotyledons being about 1 : 3, and the Genera to the Species about 1 : 3. 4. And of the 1220 genera, nearly 250 are European. The Himalaya is divided into three zones : Alpine, Temperate, and the Tropical. In the Alpine zone, which is from 11,000 to 18,000 feet, there are about 600 species under 48 Orders.

III. The Indus and the Gangetic Regions :—In the Western Indus Region four typical flora are comingled : the North African, European, Central Asian

and the indigenous which comprise about 1500 Flowering Plants, under 112 Orders in the following sequence : Gramineæ, Leguminosæ, Compositæ, Cyperaceæ, Scrophularinæ, Labiataæ, Boraginææ, which especially is highly developed. The landscape is distinguished by the following trees :—*Tamarix articulata*, *Bombax malabaricum*, *Sterculia urens*, *Ægle marcellos*, *Butea frondosa*, *Boswellia serrata*, *Balsamodendron mukula*, *Cordia myxa*, *Salvadora persica*, *Populus Euphratica*, *Moringa pterygosperma*, *Acacia arabica*, *Dalbergia sissoo*, *Terminalia tomentosa*, etc. ; of shrubs : *Gossypium* (cotton) *stocksii*, *Gossypium wightianum*, *Gossypium herbaceum*, *Tamarix dioica*, *Cassia auriculata*, *Calotropis gigantea*. In the **Gangetic Region** there are about 1500 species under 112 Orders, of which the European *Ranunculaceæ*, *Cruciferaæ*, *Caryophyllææ*, *Germinaceæ*, *Rosaceæ*, *Saxifragaceæ*, *Campanulaceæ* and *Gentianeæ* are poorly represented by sparse annual herbs. The richest Orders are *Gramineæ*, *Leguminosææ*, *Cyperaceæ*, etc., though *Cucarbitaceæ*, *Asclepiadeæ*, *Verbenaceæ* and *Amarantaceæ* are fairly well represented and *Indigofera*, *Ipomoea*, *Cyperus*, *Panicum*, *Andropogon* have the largest genera.

IV. The Eastern India :—In the Eastern Himalayas, there is comingling of 4 types of flora—Chinese (including Siberian), Malaysian, West Himalayan (with fewer European Genera) and the peninsular, comprising about 4000 species under 160 Orders, 440 species of Orchids, and 250 species of Ferns. In the *alpine zone* there are about 380 species, of which *Meconopsis*, *Rheum nobile*, *Tanacetum Gossypinum*, *Saussurea gossyfera* and *Rhodendron anthopogon* are noticeable. Two species of *Juniperus*, and numerous species of *Ephedra*, *Berberis*, *Rosa*, *Spiraea* and

Lonicera are found between 16,000 to 14,000 feet. From 14,000 (some dwarf species reach even 16,000 feet) to 9,000 feet, various species of Rhododendræ with their magnificent flowers are the striking characteristics of the Eastern Himalayan *temperate zone*. Other species as Clematis, Ternstroemiaceæ, Ilex, Liliium, Musa, Cypripidium, Plectocomia himalya also abound. In the tropical zone the Indian typical tree *Sala* (*Shorea robusta*) is met. In this zone there are nearly 800 species, of which the most important are Magnoliaceæ, Anonaceæ, Leguminosæ, Bignoniaceæ, Myrtaceæ etc. **In the Bengal coastal region**—*Ficus*, *Magnifera indica*, Nymphæaceæ, *Ægle marmelos*, *Pongamia glabrà*, *Cordia myxa*, *Vitex trifolia*, *Vitex negundo*, *Zyzyphus jujuba*, *Cassia fistula*, *Acacia tomentosa* and various species of *Musa* and *Bambuceæ* abound.

A.

1. **Añkota : Alangium** (L. from Mal. alangi ; syn : Angolam of Adamson ; Angolamia of Scopoli), a genus of alangiaceous trees, growing in India, established by Lamarck. **A. decapetalum** (syn : *Grewia salvifolia* ; *A. tomentosum* ; Ben. ānkara ; Eng. sage-leaved angolam ; Hind. dhera ; Mar. ānkoli) grows in rocky places in Malabar, and the juice of its bitter and aromatic root is employed as an anthelmintic, and the root itself as a hydrogogue cathartic in dropsy, and in the form of powder as an antidote to snake-bite. **A. hexapetalum** (syn : *A. lamarckii*) a species growing in Bengal, Malabar and Africa, has the similar properties like *A. decapetalum*, but in less pronounced degree.

2. **Aguru : Aquilaria** (L), a genus of trees, belonging to the Order Aquilariaceæ (Lamarck), distinguished by its 5-parted top-shaped calyx, with the calyx tube and alternating with the ten stamens, which are also adherent for almost their whole length to the calyx ; the anthers are versatile, and there is a single short style placed upon a bilocular ovary with a single suspended ovule in each cell. **A. agallocha** (syn : *Aloexylum agallochum*, Beng. Aguru) is a large tree with alternate lanceolate leaves, growing in Sylhet, and furnishes one of the best varieties of aloes-wood. **A. chinensis** a species growing in southern China, having lanceolate, undulate shining leaves, and solitary, terminal, 6-parted flowers. **A. malaccensis** (syn : *Aloexylum ovatum*), a tree growing 60 feet high

in Malacca and south China; having short-petiolate, ovate, acuminate leaves, and yellow-leathery flowers with ovate sepals, and its wood is one of the best aloes-wood, known as *lignum aspalathum officinale*. Ben. aguru ; Eng. aloes-wood (not to be confounded with aloes) ; Fr. bois d' aloes ; Ger. aloe-holz, or 'adler-holz ; Hind. agar. The wood is grayish-black or of greenish hue, is not very resinous, the best specimens yielding about 48 per cent of matter soluble in alcohol, has a somewhat musky pleasant odor, aromatic but not bitter. It was much esteemed by the ancients, as a perfume for medicinal preparations and for fumigations. The Chinese regard it as being tonic, stimulant, aphrodisiac and diuretic, but is chiefly used for incense as in India.

3. **Atasi : Crotalaria** (L. syn : Fr. crotalaire ; Ger. Klapperschote ; Eng. rattle pod), a genus of leguminous herbs or shrubs of the Genistææ. **C. burhia**, a small shrub growing in arid, sandy places in Sindh, the whole plant being covered with silky hairs. **C. juncea** (syn : **C. bengalensis** ; Ben. atasi ; Eng. the sun-hemp plant ; Fr. Crotalaire jonciforme ; Hind. masinā), a species from 4 to 8 feet high, extensively cultivated in India, especially in Mysore and the Deccan ; its bitter leaves are used as an emetic in gastric and bilious fevers, and also used externally, and in infusion internally in skin eruptions, the root in colic, and the seeds are employed by the women in the form of powder, mixed with oil to make the hair grow. **C. retusa** (Beng. bil-jhunjhun) and **C. verrucosa** (Hind. bunsum) are allied species. In various parts of India, however, Atasi is meant for **Linum usitatissimum** (Ben. tisi ; Eng. common flax or linseeds ; Fr. lin cultive ; Ger. Gemeiner Lein or Flachs ; Mar. javas) ; its

seeds contain oil, wax, resin, extractives, tannin, gum, mucilage, starch, albumin, gluten and various salts, and were used in ancient times as food, and the infusion made in boiling water, is employed internally in the inflammatory affections of the mucous membranes as gastritis, bronchitis, and in cystitis, stranguary and hematuria and which is demulcent, emollient, diaphoretic and expectorant. Ground flax seed mixed with boiling water forms flax seed poultice, which is spread at least half an inch in thickness upon muslin or flannel, and applied as hot as possible in order to relieve pain and congestion in peritonitis, pneumonia and pleurisy. Flax seed poultices are also applied to boils and abscesses to soften the skin or hasten ripening. Oil of flax seed can be also profitably applied to burns to exclude the air.

4. **Ati-visā : Aconitum**, a genus of herbaceous plants of the natural Order—Ranunculaceæ, and the Tribe Helleboreæ, distinguished by the presence of five sepals, the upper one of which is hooded and covers in the upper petals. The species are liable to great variation. **A. Ferox** a variety of *A. napellus*, a European perennial herb, from which official *aconitine* is made, is found in the Himalayas, and its rhizome which is used in medicine, is conical in shape, from 2 to 4 inches long, and 1 inch thick, and is intensely acrid and poisonous. Ben. ātaicha ; Eng. monkshood ; Fr. char-de-venus ; Hind. atisa ; Mar. ativisa. Its terrible toxic effect is due to the alkaloids, forming about 0.97 to 1.23 p. c. of aconitine, picroaconine, aconitine, picroaconine, aconine, benzoyleaconine; napelline and homonapelline which depress the heart action and paralyse the respiratory centre. However the benumbing

effects of aconite have been utilized in the treatment of neuralgia in the external application of *linimentum aconiti et chloroformi*. Its depressant action upon the heart has been utilized in the treatment of hyperpyrexia, and exanthemata. However it is counter-indicated in the typhoid fever. In the early stage of the inflammatory processes—pneumonia, pleurisy, pericarditis, peritonitis, erysipelas, rheumatism, meningitis, and in ephemeral high fevers of childhood, it modifies materially the severity of the symptoms, reduces temperature and moistens the skin. In spasmodic croup and asthma, in coryza and quinsy, it has given relief within a few hours. **Antidotes:** The antidotes to aconite are tannic acid, astringent infusion, alcohol and ammonia. The patient should be kept in a recumbent position, with his head lower than his feet, and be kept warm. *Digitalis* may be also used to counteract the depressant effect upon the heart.

A. heterophyllum a species found in India, the rhizome of which is conical or fusiform, but devoid of acridity, of pleasantly bitter taste, and is regarded as antiperiodic and tonic, but non-poisonous. The plant is eaten as a vegetable. **A palmatum**, a species found in the Himalays, the root of which contain a very bitter alkaloid, but is non-poisonous.

5 **Aparajitā: Clitoria** (L), a genus of tropical leguminous twining shrubs of the Tribe—Phaseoleæ. *C. mariana* (sveta variety), a species found in India and in Southern U. S. A., bearing very light-blue flowers, and are used for cramps and paralysis. *C. ternatea* (syn : *C. spectabilis* : Ben. nila-aparajita ; Eng. butterfly-pea ; Fr. clitore de Ternate ; Hind. nili-koyala), a species

with blue flowers, found in India and Cochin-China. In Cochin-China, the flowers are used as a dye, the root as a purgative and vermifuge, and a safe emetic in the powder form for the children in croup. In India the root is used as a diuretic and demulcent, and the seeds are given to the children in colic.

6. **Apāmārga : Achyranthes** (L), a representative genus of *Achyrantheæ*. *A. aspera*, a species growing in India, South Africa and Egypt (syn : *cadeleri* ; *Ar. atkam* ; *Ben. āpāng* ; *Hind. ongā*), and is used as an astringent 'depurative, as a remedy in dropsy,' and as an antidote to the venom of scorpion. *A. fruticosa*, an East-Indian species and is used for the same purpose. *A. globulifolia* a Madagascar species, and is employed there as a remedy for syphilis. *A. obtusifolia*. a species found in the Indus valley, and is used as a diuretic.

7. **Amla-vetasa : Rheum** (L), a genus of polygonaceous herbs. *R. australe*, *R. spiciforme* *R. moorkroftianum* are Hiamalayan species of rhubarb. Syn : Eng. Himalayan species of rhubarb. Syn : Eng. Himalaya rhubarb ; Fr. rhubarbe de Perse ; Ger. Rhabarber. Hind. amalavet. Per. tursak. They are active purgative and superior astringent and tonic to Chinese and Russian species. The rhubarb root contains chrysophan, rheotannic acid, emodin, a neutral substance forming colorless crystals, several resins, an albuminoid principle insoluble in alcohol, but soluble in water, mucilage (11 to 17 p. c.) extractives, tannic and gallic acids, sugar, starch, pectin, lignin, calcium oxalate, and various inorganic salts. The rhubarb root of all species is more or less purgative and cholagogue, and in small doses (5 to 10 grains) is a mild laxative and stomachic tonic.

It is beneficial in dyspepsia attended with constipation or with deficient biliary and intestinal secretions, in chronic dysentery, and is of special value in duodenal catarrh or catarrh of the biliary ducts with jaundice and in certain skin diseases. In the Gangetic valley, East Indies and South India, wood-sorrel is understood by *amla-vetasa*. **Oxalis** (L. Eng. wood-sorrel), a genus of the Geraniacæ, including *Hypseocharis*, *Oxalis*, and *Averrhoa* and other genera in which the flowers are regular, the sepals imbricated, the glands wanting, the stigmas capitate, and the leaves compound. They are habitats of tropical and temperate region, and they contain usually an acid juice and the roots are esculent. **Oxalis corniculata** (syn. Fr. oseille a trois feuilles, ou du bois; Ger. gehornter Saurklee; Hind. amrul), the procumbent yellow-flowered species of wood-sorrel found in India, South Europe, and the leaves, stalks and flowers are used as refrigerants, especially in dysentery, and the juice which contains salts of oxalic acid, is applied externally to remove warts. **O. repens**, a species found in Ceylon, Madagascar, southern Africa and Brazil, is used as refrigerant.

8. **Amlīkā. Tamarindus indica** (L. Ar. tamar-hindi, Ben. tetul; Eng. tamarind; Fr. tamarinier; Ger. Tamarinde; Hind. amli; Tam. pnli), a genus of the Leguminosae, indigenous in India, North-western Australia, and Eastern Africa, but now cultivated in all tropical climates, and the tree is about 60 to 70 feet high. The tamarind pulp is laxative and refrigerant, containing tartaric acid, acid potassium tartrate, traces of citric and malic acids, gum, sugars, pectid, but it weakens the action of resinous cathartici, while increasing that of cassia and manna. In India the seeds and the bark are

reputed to be tonic and anti-dysenteric, the leaves as an anthelmintic for jaundice, and for collyrium and wash for foul ulcers. The cotyledons are also used as poultices in rheumatism.

9. **Arka-puspi, Cleome** : a genus of the Capparidaceæ, Tribe Cleomæ. *C. dodecandra* (Fr. cleome a douze etamines) indigenous in U. S. A. and India where it is used as a vermifuge. *C. felina* (Fr. cleome de l'Inde), a native of India, where mixed with milk and sugar, it is employed to arrest epistaxis. *C. pentaphylla* (syn. Eng. spider-flower; Fr. cleome a cinq feuilles; Hind. arkahuli; Guj. kharner), a native of the Indus valley, and is used as a sudorific and stimulant. *C. viscosa* (syn. Ben. hur-hur; Eng. dog-mustard; Hind. hurhuj), an annual of the Gangetic valley, where the seeds are used as mustard seeds, also as anthelmintic, astringent, and carminative, as well as a remedy for infantile convulsion; the juice of the leaves is used in otorrhea and deafness, and infusion of the seeds is employed topically to kill maggots.

10. **Arjjuna : Terminalia**, a genus of the Terminaliaceæ, and belonging to the sub-order Combreteæ. *T. alata* (Fr. badamier aile) an East Indian species, the bark of which is febrifuge, and the juice of the leaves is injected into the ear in otitis. *T. angustifolia* (Fr. badamier benjoin; Ger. falscher Benzoebaum; schmalblattriger Catappenbaum), a species found in the East Indies and the Mauritius, yielding a resin, which is much esteemed as a cosmetic and an incense; the fruits are used for their rich tannic acid contents, and their almond-like seeds contain a bland oil which is eaten. *T. arjjuna* (Ben. arjjuna; Guj. kārō; Hind. kauha; Tel. matti-chettu;

Mar, arjjuna-sārrā), is found all over India, and its astringent bark is used as a cholagogue and vulnerary, and the juice of the leaves in otalgia, and the fruit as a deobstruent and tonic. **T. Bellerica** (Ben. vaherā ; Eng. belleric myrobalan ; Guj. verāṅg ; Hind. vahere ; Tam. tani) is found all over India and Ceylon. The fruits are astringent and tonic, and their kernels yield an oil which is used as a hair tonic, and is also eaten, but in large quantity it becomes narcotic. The oil mixed with honey is used in ophthalmia. The bark by incision yields an insipid gum, and the leaves are astringent. **T. catappa** (Fr. badamier de Malabar ; Ben. ingudi ; Hind. Hingot ; Ger. achter Cattapenbaum) a native of Moluccas and Malabar, a large Malabar almond tree, the kernels of the fruits of which yield a straw-colored oil, having the taste and the odor of the almond oil, the bark is astringent, and the leaves yield a black pigment which is used to color teeth and to prepare ink. **T. chebula** (Ben. haritaki, Eng. black myrobalan ; Fr. badamier chebule ; Ger. rispiger Myrobalanenbaum ; Hind. harar ; Mar. hartaki ; Tam. karkai), is found in the tropics of both hemispheres, and its highly astringent fruit is used in tanning, as a purgative, and as an application to ulcers and in skin diseases. The astringent galls produced on the leaves are used in infantile diarrhoea. Kernels yield an edible oil. **T. citrina** (Ben. putana ; Eng. Hara-nut tree ; Fr. Bedamier citrin ; Ger. gelber Myrobalanenbaum ; Sans. kāvyā) a native of Bengal, the fruits resembling the Terminalia chebula, but of yellowish color and more bitter. **T. tomentosa** (Ben. piyā sāl ; Sans. asana), a native of the East Indies, yielding a gum used as a cosmetic and incense. The

astringent bark is used for indolent ulcers, and atonic diarrhoea, and it contains much calcareous matter, yielding an ash, which is used by the chewers of the betel-nut.

10. Alavu : Cucurbita, a genus of Cucurbitaceæ **C. lagenaria** (syn. *Lagenaria vulgaris* ; Ben. lāyu ; Fr. gourde ; Eng. bottle-gourd ; Ger. Flaschenkurbis ; Guj. dudhlu ; Hind. tombi), a native of tropical Asia and Africa. The pulp of the fruit is laxative, and is used by the poor classes as a vegetable food ; the leaves mixed with sugar is prescribed in jaundice ; the seeds are diuretic. One variety is poisonous. **C. maxima** (Ben. kumra ; Eng. large red pumpkin ; Fr. courge ; Ger. Riesenkurbis ; Hind. kumbhra), a species indigenous of the tropical and subtropical countries and its fruit sometimes attains a weight of 150 pounds, and the pulp of which is edible, though a little heavy. The seeds are tæniacide. **C. melopepo** (Eng. squash ; Fr. melopepon ; Ger. Turbanbund-Kurbis ; Sans. karkaru) is a cultivated species with tender edible fruits. **C. pepo** (Eng. common pumpkin ; Fr. potiron courge ; Ger. gemeiner Kurbis) gives an edible fruit, and the seeds are used as a vermifuge.

11. Asoka : Saraca indica, a genus of the Leguminosæ, found all over India. Its bark is used in dysmenorrhœa and against hemorrhoids, and the leaves as an alterative and in colic.

12. Asva-gandha : Withania, a genus of solanaceous shrubs. **W. coagulans**, a shrub common in Afghanistan and in northern India, the dried berries of which contain a ferment, closely resembling animal rennet, and which are used for coagulating milk. The fruits when fresh, are emetic ; but dried fruits are used in dyspepsia, and

flatulent colic. The bitter leaves are anthelmintic. **W. somnifera** (syn. *Physalis flexuosa* ; Ben. asvagandha ; Eng. Indian winter-cherry ; Hind. asgandh), grows all over India. Its root and bitter leaves are powerfully narcotic, and have been used as a hypnotic in alcoholism and emphysematous dyspnea. The leaves are used as an anthelmintic and as an application to carbuncles ; the root as a deobstruent, diuretic, and alexipharmac, and as an application in obstinate ulcers and rheumatic swellings ; the fruits as a diuretic and to coagulate milk.

13. **Aksota** : *Juglans regia*, a genus of the Juglandaceæ, a native from Caucasus and Armenia to the mountains of north-western India, but now cultivated and naturalized in temperate regions. Syn. Eng. walnut ; Beng. akhrot ; Fr. noyer cultive, gognier ; Ger. Wallnussbaum ; Hind. akhrot. The unripe fruits and the external layers of the nut (*fructus juglandis viridis et cortex*), are used as vermifuge, in gout, chronic skin diseases and old ulcers. The leaves which have an aromatic bitter principle and are astringent, are used in scrofula, and as an application in malignant pustule. The thin yellowish membrane (*episperm*), has been recommended in colic, and contains mucitannic acid. The seeds yield a yellow pungent oil (*oleum juglandis* ; Ger. Wallnussöl), which is used internally as a tænicide and a laxative, and externally in caligation (dimness of vision). **Aleurites triloba**, a species, belonging to the euphorbiaceous plants of the Tribe Jatrophææ, found in the islands of the Indian and South Pacific oceans. The trees grow to the height of 30 or 40 feet, bearing a two-celled fleshy fruit, each cell containing one seed, resembling a small walnut

in shape yielding a fixed oil, known as *kukui oil* or *artists' oil* used extensively in oil-painting, and to which is ascribed often the impermanence and changeability of colors of modern painting. In commerce, the nut is known as *Tutui nut*, *Bancoul nut*, *Belgaum walnut*, or *Indian walnut*.

14. Ahi-phena : Papaver somniferum. a genus of the Papaveraceæ, a native of Cyprus and Peloponnesus, distinguished by having the leaves, peduncles and sepals covered with scattered bristles, and probably introduced into India by the Arabs in the thirteenth century. Syn. Ben. aphing ; Eng. opium poppy ; Fr. oeillette, pavot somnifere ; Ger. Schlafmohn ; Hind. aphim. Opium is the concrete, milky exudation obtained by incising the unripe capsules of *Papaver somniferum*, which in its inspissated form, occurs in chestnut-colored mass or lumps, with an earthly narcotic odor, and bitter taste, containing about 9. p. c. of **Morphine**, which is the narcotic principle and induces drowsiness, one-half per cent of **Codeine**, which has half the narcotic strength of morphine, but more calmative, 2 to 10 p. c. of **Narcotine**, having no narcotic effect, **Anarcotine**, which reduces bodily temperature, **Thebaine**, one-fourth per cent, a convulsive agent, and spinal excitant, 0.02 p. c. of **Narceine**, which is narcotic, 1. p. c. **Papaverine**, a narcotic and convulsant, **Cryptopine**, **Pseudomorphine**, **Protopine**, **Cotomine**, **Laudanine**, **Codamine**, **Rhocadine**, **Meconidine**, **Laudanosine**, **Lanthopine**, and **Gnoscopine** in small amounts, with neutral principles—meconin, meconoisin, and prophyroxin, and meconic, lactic, citric and tartaric acids. **Physiological action :** Opium is narcotic, anodyne, antispasmodic, intoxicant and a cerebral depressant,

having a bitter and somewhat acrid taste. The hypnotic action of opium is due partly to the lessened activity of the cerebral cells, and partly to the reduction of the blood supply to the brain-centres. Opium and its chief derivative really affects the nervous system. In small doses, it depresses the action of the spinal cord, and in large doses, it provokes its irritation, and thereby can even produce convulsions. The heart and circulation become depressed, and the body temperature reduced. A stuporous sleep is induced, with irregular, slow respiration, cold, clammy skin, and pin-point contracted pupils. If a fat dose has been taken, all these symptoms are intensified, the pulse becomes slower, respiration is reduced to five or six to the minute, reflexes become abolished, and death occurs from paralysis from the respiratory centre and the carbonic-acid accumulation in the blood. **Treatment of Opium poisoning :** The stomach should be promptly evacuated with quick-acting emetics. A tablespoonful of mustard powder or alum in a pint of hot water acts as an efficient emetic, and Tannic acid may be also given as a chemical antidote, and to prevent the absorption. After the stomach has been washed out, a pint of warm coffee should be injected into the stomach and the rectum. Artificial respiration should be practised if necessary. And circulation should be maintained by massage, rubbing the blood up toward the body from the extremities, and if the blood is excessively carbonized, venesection may be performed to advantage. The surface of the body may be stimulated by whipping with fringed end of towels or with twigs. And when consciousness has been restored, the patient should be made to walk, supported by two assistants, until the influence of opium has entirely

passed off. **Therapy**: Opium may be made into a paste with water, and applied to an incipient boil for relief from pain. In the treatment of Diabetes mellitus, it has been also found very useful, by diminishing hunger, and the urine-excretion. In the declining stage of bronchitis, it is beneficial, as it relieves the irritation and produces sleep, from the annoyance of incessant coughing, but it is counter-indicated in the early congestive stage. In various convulsive affections, due to its antispasmodic action, it can also be profitably utilized.

Khasa-vija: **Fructus Papavel somniferum** (Syn. Ben. post-dāna; Eng. poppy sees; Hindd. Khas-khas; Fr. graine de pavot; Ger. Mohnsamen), is of sweetish taste, non-acrid, non-narcotic, and oily, which is about from 50 to 55 per cent, consisting of glycerides, linolic, oleic, palmitic and stearic acids, as well as linolenic and isolinolenic acids. The poppy seed oil is used in France and Germany as a salad oil.

15 Asvatta: **Ficus**, a genus of urticaceous trees. **F. arbutifolia**, a species found in India and Mexico (syn. Ben. pakur; Fr. figuier a petit fruit; Hind. pākār). The juice of the branches or the milky exudation is applied in poisoned wounds, indolent ulcers, and is used as a resolvent. **F. bengalensis** (syn. **F. indica**; Ben. vātā; Eng. banyan tree; Fr. figuier du Bengal; Hind. var; Tam. ala), a very large species with spreading branches. It furnishes lac. Its seeds are refrigerant and tonic; the milky exudation as odontalgic; and the bark as a tonic and diuretic. **F. carica**, the common commercial fig of western Asia, which is nutritious and laxative and is used externally in cataplasms. **F. heterophylla**, a species found in the East Indies.

The juice of its root is used in colic, and mixed with milk, in dysentery; the bark of the roots mixed with aromatics is given as a pectoral. **F. oppositifolia**, a species found in Bengal and East Indies (syn. Ben. kaka-dumar), whose bark is antiperiodic and tonic, and fruits, seeds, and bark are used as emetics. The milky juice is poisonous. **F. glomerata**, a native of Bengal and East Indies (syn. Ben. yagna-dumura; Eng. cluster-fig; Hind. gulara), whose root is used in pectoral complaints and dysentery; the bark is applied to the ulcers; the fruit is edible, but insipid. **F. religiosa**, a species found all over India (syn. Ben. asvattha; Eng. sacred fig; Fr. figuier (ou arbre) des pagodes (ou de Dieu, ou conseils); Ger. religiöser Fiegenbaum; Hind. pipala). Its seeds are refrigerant, and alterative; the leaves astringent and purgative, and an infusion of the bark is used in scabies. The tree also yields lac. **F. elastica** (Fr. figuier elastique), the Assam rubber tree, indigenous in Assam, contains about 30 per cent of caoutchouc in its milky exudations

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16. Ādraka : Zingiber. a genus of plants, forming with *Costus*, *Elettaria*, *Alpinia*, *Amomum*, an Order *Gingiberaceæ* of monocotyledons, a Tribe of the *Scitamineæ*. **Z. cassumunar**, (Ben. chavikā or chai ; Eng. Bengal root), a climber, indigenous in East Indies, Java, the root of which (*radix cassumunar* ; *cosmonar*, *Zingiberis silvestris*, *Zedoaria lutea*) has a spicy, bitterish taste, and a strong camphoraceous smell ; it is stimulant and carminative. **Z. officinale**, (syn. Ben. ādā ; Eng. ginger ; Fr. gingembre ; Ger. Ingwer ; Gr. ziggiberis, from Sans. smṅgavera ; Hind. adrakh ; Mar. āle ; Tel. allam) a native of eastern and south India, and now cultivated in the tropics for its fleshy rhizome which constitutes the ginger. Ginger contains starch, 2 to 3 p. c. of essential oil (composed of cymene, camphene and phellandrene), resin, two resinous acids and a pungent yellowish volatile oil—*gingerol*. It is an agreeable carminative and stimulant, increasing the secretions and promoting peristalsis ; externally it is rubefacient. **Z. zerumbet** (syn. Ben. suth ; Fr. amome suave ; Hind. soth ; Tal. sothī) is a broad-leaved ginger found in Ceylon and in the East Indies, and its root-stock (*radix zerumbet* ; *bringalle inodorum*) is aromatic, but slightly bitter.

17. Āmalaki : Phyllanthus, a genus of the *Euphorbiaceæ*. **P. emblica**, (*Embllica officinalis* ; Ben. āmalaki ; Fr. emblic officinal, *Phyllanthe emblic* ; Ger. gebräuchlicher Amlabaum, *Myrobalanenbaum* ; Hind. āmlā ; Mar. amvale), is a large tree, indigenous in India. The fruit is

used in diarrhœa and dysentery ; it contains about 45 p. c. of tannic acid ; and is used extensively in dyeing and in making ink. An infusion of the seeds is given as a febrifuge, as a collyrium, and in diabetes. The root bark mixed with honey is employed in aphthous stomatitis. In Turkeystan, the fruit is used in the inflammation of the eyes and lungs, and in Persia as a vermifuge. The fruit is edible, and is regarded as an astringent tonic. *Phyllanthus* is a large genus of plants, comprising nearly 500 species, distributed in tropical countries, characterized by entire alternate leaves, and apetalous monoecious flowers, the male in glomerate clusters and from 2 to 6 stamens, and the pistil consisting of three to many carpels, their two cleft styles not dilated below the apex. ***P. multiflorus***, (Fr. *phyllanthe multiflore* ; Ger. *vielblutige Blattblume*), a species in the East Indies, the root of which is alterative, and is used in vesical affections. ***P. niruri*** (Fr. *phyllanthe niruri*, *herbe du chagrin* ; Ger. *weisse Blattblume* ; Hind. *niruri*), a perennial herb of northern India. Its root and leaves are used as diuretic and deobstruent, especially in jaundice ; its young shoots in dysentery ; and the juice of the stem mixed with oil in ophthalmia. The herb and the leaves are stomachic ; pounded with the root, and combined with rice-water, it is used as poultice for ulcers and swellings. ***P. oblongifolius*** (Ger. *ovalblattrige Blattblume*), an Indian species, the root-bark of which is a stomachic tonic. The root-bark, stem, and branches, together with leaves and fruits are used in baths for gout. ***P. pedunculatus*** (Ger. *langstielige Blattblume*), a Malabar shrub, used as a pectoral. The leaves and root are applied in inflammatory swellings. ***P. restusus***, a large

East Indian tree, the root of which is astringent, and is used together with the fruit and the leaves as a pectoral. **P. rhamnoides** (Fr. *phyllanthe rhamnoide* ; Ger. *wegdomahnliche Blattblume*), an East Indian species, the leaves of which are used as discutent, and warmed in castor oil in anthrax. **P. simplex** (Ger. *einfache Blattblume*) an Indian species, used in pruritis in children. **P. sbuamifolius** (Ger. *schuppen-blattrige Blattblume*) a Cochinchina species, the fruits, flowers, and leaves of which are emollient and discutient. **P. urinaria** (Fr. *phyllanthe urinaire* ; Ger. *harntreibende Blattblume*) a varian of Indian *P. niruri*, indigenous in East Indies and Cochinchina, where the entire plant is used as a powerful diuretic in syphilis, and as an emmenagogue. **P. virosus**, (Fr. *phyllanthe vireux*) an East Indian species, supplying fish poison.

18. **Ākṣa-valli : Cassytha filiformis**, a species of tropical climbing lauraceous parasitic herb, growing on the branches of trees in India, and which is used to flavor butter-milk as a refrigerant for feverish patients, as a remedy in gonorrhea, especially in urethritis, as a hair-wash, and as an application to inflamed eyes and indolent ulcers.

19. **Āmra : mangifera**, a genus of dicotyledonous choripetalous plants of the Family-Anacardiæ (Cashew family), having 27 species, all tropical, distinguished by simple, entire, coriaceous leaves, and polygamodioecious flowers, which are small and grow in much-branched panicles, the fruit a fleshy drupe, more or less fibrous within, and usually with more or less of turpentine flavor. **M. foetida**, a species indigenous in Cochinchina, with edible fruits, but fibrous and terebinthaceous.

M. indica (syn. **M. amba**, **M. domestica** ; Ben. ām ; Eng. mango ; Fr. mangier ; Ger. Mangobaum ; Hind. ām ; Mar. āmvā ; Tel. māvirī), a species cultivated in India for its edible fruits, which in their unripe state are made into tarts and pickles. The kernel, which contains a good deal of gallic acid, is used as an anthelmintic, and in hemorrhoids and menorrhagia. The bark yields a somewhat pungent and bitter gum-resin, which is used as an astringent in catarrhs, in scabbies and cutaneous lesions. **M. oppositifolia**, a lofty, spreading mango-tree with fine-flavored, sweet edible fruits, indigenous in Burma. **M. silvatica**, a species with edible fruits indigenous in the East Indies. The rind of the mango contains tannin, and a bitter crystallizable substance—mangostin. In the form of decoction, it is beneficial in diarrhoea, dysentery, and as an astringent wash in sore throat, nasal catarrh and leucorrhœa. The juice from the bark can be used with advantage for the same purpose.

20. **Āmrataka** : **Spondias**, a genus of the poly-petalous trees, of the Family-Anacardiaceæ, having 6 species distributed in the tropics of both hemispheres. **S. cytheræ**, a species indigenous to Friendly and Society Islands in the Pacific. **S. lutea**, a native of the west Indies. **S. mangifera** (syn. Ben. āmara ; Eng. hog-plum ; Hind. āmbarā), a species, indigenous in eastern India, with sour edible fruits. Its root is used as an emmenagogue, the powdered root-bark as an anti-dysenteric, and the decoction of its wood in gonorrhœa and leucorrhœa. A mild, insipid gum, exuding from the bark, is used as a tonic, and in fumigation. The Chinese use the juice of the fruit in the

preparation of hair-tonics. *S. mombin*, a species with edible fruits, but poisonous seed, is a native of the West Indies. *S. tuberosa* a Brazilian species with refrigerant edible fruits, and the tubers containing potable sap. *S. venulosa*, a species of the East Indies with an aromatic and astringent bark which is used in the form of decoction in cattarrh, urethritis, and leucorrhœa.

21. **Araki** : *Cajanus indicus*, a pulse-supply species, belonging to the Family Fabaceæ, a native of Malabar, but now extensively cultivated in the tropics as an article of food. It has two varieties : *Cajanus flavus* (no-eye pea, having a uniformly yellow vexillum), and *Cajanus bicolor* (congo pea, with the vexillum yellowish within, purplish and veined without). The former is a better kind. It is known in Eng. pigeon pea ; Ben. arhara ; Hind. rahar ; Mal. catjan, from which the Latin name has been derived ; Mar. turi.

22. **Aragvadhā** : *Cassia*, a genus of leguminous plants, of the Tribe—Cassieæ, comprising about 340 genera, distributed into the subgenera—*Fistula*, *Cathartocarpus* and *Senna*. *C. absus* (Ger. agyptische Cassie), a low annual herb of Upper Egypt and Sind. Its brownish-black shining seeds are used in Egypt as a specific for Egyptian ophthalmia. In India they are employed as a depurative, and in mucous diseases. *C. acutifolia* (syn. *C. senna* ; *Senna acutifolia* ; Alexandrian senna ; Ger. spitzblattrige Cassie), an Egyptian shrub, which supplies a good deal of the demand of market for the senna cathartic. *C. angustifolia* (syn. *Senna officinalis* ; Indian senna ; Tinnevelley senna ; Hind. senna), an annual species growing in Southern

Arabia, Sind and the Punjab. Senna-leaves contain Chrysophanic acid, sennacrol, sennapicrin, cathartomannite, tartaric and oxalic acids, earthy and alkaline carbonates, and cathartic acid, which is the active principle. Senna is much used as a reliable purgative, usually with an aromatic and an alkaline salt to prevent griping. *C. auriculata* (*Senna auriculata* ; Ger geohrte Cassie), a shrub growing in India. Its root is employed in tanning, and as a remedy in cutaneous and urinary affections ; the bark in tanning, and in the preparation of a medicated oil which is used internally and externally in syphilis and skin-lesions ; the decoction of the flowers is reputed to be beneficial in diabetes and spermatorrhea ; seeds are employed in diabetes and rheumatism, and a powder made from them is insufflated into the eye in ophthalmia ; the gum is used in the preparation of astringent confections. The whole plant is astringent, refrigerant and alterative, and a powder made from the mixture of the root, bark, leaves, flowers and pods, is given in diabetes and gout. *C. coromandeliana* (*C. and Senna sophora*), an erect herb of eastern India and East Indies ; its pods and seeds which are rich in tannin, are used in dyeing black ; the young leaves are eaten as mild laxative ; the bruised leaves and the root-bark are used in liver and skin diseases ; the bark and the seeds are employed in diabetes. *C. elongata*, a variety of *C. angustifolia*, and supplies Indian senna. *C. fistula* (Ben. sonālu ; Eng. purging cassia ; Fr. casse officinale ; Ger. Rohren-cassie, Purgircassie ; Hind. āmaltās ; Mar. vāhāvā), is a native of India and the East Indies, now naturalized in the tropics as an ornamental shrub and for the beautiful flowers and pods. Its fruit forms long, brown,

cylindrical pods, divided into numerous compartments, each containing a single seed, imbedded in a brown-blackish pulp which has sweetish taste, and is a pleasant and good mild laxative. The pods are also sometimes used as a laxative, and the seeds are ground and used for poultices. The bark which contains a good deal of tannin, is used for astringent decoction, as well for tanning. *C. tora* (syn. *C. toroides* ; *Senna tora* ; Ben. *chākandīā* ; Sans. *chakramardda*), an annual herb, indigenous in eastern India and the East Indies. The leaves are used as an aperient for children, and are applied to ulcers, itching eruptions, and in poultices in pustules. The bruised leaves are applied to parts, stung by insects, especially the bee. The root is used topically in ringworm, and the seeds are employed in making a blue dye.

23. *Āluka* : *Ipomœa*, a genus of dicotyledonous, sympetalous plants, comprising about 300 species, all natives of the tropics. *I. batatas* (Ben. *ālu* ; Eng. sweet potato ; Fr. *truffe douce*, *patate de Malaga* ; Ger. *Batate*, *Bataten* 'Trichterwinde' ; Hind. *ratalu* ; Mar. *ratalle* ; Tel. *chirageru*), a species indigenous in India, now cultivated throughout tropical and sub-tropical regions for its tuberous root—the sweet potato. Sweet potato contains a good deal of starch and sugars, but as it is very fibrous, it is apt to ferment easily, provoke flatulence, but is aperient. *I. cœrulea*, a species indigenous to India, and well noted for their purgative seeds. *I. cymosa*, a species found in the East Indies and the islands of the Indian ocean, the leaves of which are used in Moluccas as an emollient in abscesses and ulcers. In Bengal the seeds (Ben. *sapussundu*) are soaked in water which yield a mucilage, which is used as an

aperient, and as an alterative in cutaneous diseases. **I. pes tigridis** (Mal. arti ; Sing. diwipahuru) a species found in Malabar and Ceylon, and in the East Indies, where the leaves are used as an emollient application to tumors and the bites of rabid dogs. **I. nil** (Eng. blue morning glory ; Fr. ipomea nil), a widely distributed species, cultivated as a garden annual, distinguished by the clear blue color of the border of its large flowers, a native of India, where its seeds (Hind. kaddana) are roasted, ground, and used as a purgative. **I. turpethum** (Ben. dudh-kalmi ; Eng. Indian jalap ; Fr. turbith vegetal ; Ger. Turpith-Trichterwinde ; Hind. nisoth, nakpatara ; Mar. nisotara, phutākari ; Sans. trivrt ; Ar. tarvad ; Tam. sivada), a species indigenous to India, the root of which supplies the active purgative principle-turpethum. The root and the stem are used in India as a purgative.

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24. **Iksvaku** : *Citrullus*, a genus of Cucurbitaceæ, comprising two species, indigenous to southern Africa and tropical Asia. **C. amarus**, the wild water-melon of southern Africa, supplying a bitter drastic principle. **C. colocynth** (Ben. makala ; Eng. bitter cucumber or apple ; Fr. coloquinte ; Ger. Coquintenapfel ; Gr. kolokynthis ; Hind. titloki ; Per. kututalakh) is an annual plant, the stems of which are herbaceous, hairy, and trail on the ground or attach themselves to neighboring plants by their tendrils. The flowers are yellow and axillary. The

fruit is a globular pepo of the size of a small orange, yellow and smooth, and contains a white, spongy, medullary matter, enclosing numerous ovate, compressed seeds. Though the seeds are bitter, they are inactive. It is the pulp alone which contains about 14 p. c. of the active purgative principle—colocynthin, besides oil, resin, gum, pectin, extractive, etc. Colocynthin is a powerful purgative, and hydragogue, and mixed with other ingredients, it makes an efficient and effective cathartic.

25. **Ijjala : Eugenia**, a genus of myrtaceous plants of the tribe—Lecythideae. **E. acutangula** (syn. **Barringtonia acutangula** ; Ben. hijala : Hind. ijara) a tree growing in Bengal and Travancore. Its root is bitter, refrigerant, and laxative. The seeds are used as an aromatic carminative, and in parturition. **E. racemosa** (syn. **Barringtonia racemosa**), an evergreen tree, growing nearly 40 feet high on the coast of eastern India and the East Indies, have almost the similar properties as **E. acutangula**. But the powdered fruit is used as a sternutatory, and applied externally in sore throat and eruptive affections. The root is used as fish-poison. **Barringtonia speciosa** (syn. **Mammea asiatica**), a tree from 30 to 50 feet high, growing in the Deccan, Ceylon, East Indies and the Pacific Islands, whose fruit is eaten when green, and an illuminative oil is obtained from its seeds. **E. jambolana** (syn. **Syzygium jambolanum** ; Ben. vana-jāma ; Sans. jala-jambukā), a tree growing in the eastern coast of India and in the East Indies, the root-bark of which is used as astringent, the bark of the stem and the branches in apthae, the astringent and acidulous fruits in gargles, and in preparation of astringent

and stomachic syrups. *Jambosa vulgaris* (syn. Ben. golāp-jām ; Eng. rose-apple ; Ger. rosenapfel-Jambuse ; Hind. jāmun), a tree widely cultivated for its fruits in Bengal and in the East Indies for its refrigerant fruits. A fine rose-water can also be distilled from it. The leaves and the bark are astringent, the fruits and the withered flowers are used as febrifuge, and the seeds which are aromatic, in diarrhoea and dysentery.

26. *Irimeda Acacia*, a large genus of shrubby or arborous leguminous plants, belonging to the natural Order Leguminosæ, and the sub-order Minosæ, natives of tropics of both hemispheres, especially of Africa and Australia, comprising about 450 species, distinguished by small regular, polygamous flowers into globuse heads or cylindrical spikes, and very numerous free stamens. *A. arabica* (syn. *Mimosa arabica* ; Ben. bāblā ; Hind. babul ; Sans. Bavvula), indigenous to India, but a variety of *A. verec*, a species in Eastern and Western Africa, north of the Senegal river, supplying the official *gum arabic* growing about 20 feet high, and furnishing an inferior sort of gum arabic (Hind. gond-babul). Its bark contains a large amount of tannin, and is used as an astringent and tonic ; the bruised leaves are applied to ulcers, and the pods (babla) are regarded as an expectorant. *A. catechu* (syn. *A. suna*, *Mimosa catechu* ; Ben. khadira ; Hind. khaira ; Fr. cachoutier), a tree growing in India and Burma, about 12 feet high, from which catechu is made by evaporating a decoction of the inner red or the brownish wood of the trunk. *A. coconninna*, a species found in India, whose pods contain saponin which is used as an emetic and an expectorant, and for cleansing the hair. *A. farnesiana*,

a widely distributed species, now cultivated as an ornamental shrub, and the delicious fragrance of its flowers ; but in wild state the odor is penetrating and fetid, as in India (Ben. vit-khadira ; Eng. sponge tree ; Fr. acacia de Farnese, casse du Levant ; Hind. gandhabul ; Sans. irimeda). It furnishes a gum, resembling gum arabic ; its bark is astringent ; the leaves are used in West Indies in the bladder diseases, and its flowers are stimulating. In the West where it is extensively cultivated, a fine perfume is distilled from its flowers, and is reputed to be alterative. **A. lebbek** (syn. *Mimosa lebbek* Ben. sirisa, Tel. dirsan), a species indigenous to Upper Egypt, India and the East Indies. It yields a kind of gum resin. The leaves are used in fomentations and baths in rheumatic pains. The seeds are poisonous. **Mimosa pudica** (Ben. lajjāvati ; Eng. sensitive plant ; Fr. herbepudique ou vive, mimeuse ; Ger. shaamhafte Sinnplanze, Fuhlplanze ; Sans. lajjālu), a small, spiny plant, indigenous to the West Indies, now cultivated throughout the tropics, which is very sensitive, and the leaflets curl up on being touched ; the bitter emetic root is used as an aphrodisiac, and as an antidote to poisons, and the leaves are employed as a bath in the pains of the hip and kidneys and in plasters of glandular swellings. Gum acacia (*Acaciæ gummi*) is a muciliginous, insipid substance, composed of arabin, gummin, united with calcium, potassium and magnesium salts. It is soluble in water, but insoluble in alcohol. It is chiefly esteemed for its adhesive qualities. However in bowel disorders and fevers, a thin mucilage, flavored with lemon and sweetened, makes a nourishing, bland drink which relieves thirst. Irritation* in the throat also is relieved by gum arabic troches.

27. **Indrayava : Holarrhena**, a genus of tropical apocynaceous shrubs or trees. *H. africana*, a species growing in tropical Africa, the bark of which contains an alkaloid, similar to that of *H. antidysenterica*, and is used in dysentery. *H. antidysenterica* (Ben. *kurchi* ; Hind. *indrajou*), a species indigenous to India and the East Indies, and its bark contains a bitter alkaloid, which has a tonic and astringent properties, and was used formerly in Europe as an antidysenteric and antiperiodic, and was known as *Tellicherry bark*. Its seeds are used as lithotriptic, anthelmintic and aphrodisiac, and in dysentery and chronic pulmonary affections, and roasted are given in infusion to allay vomiting in cholera. Pessaries composed of the ground bark and the seeds are given after delivery as a tonic and vulnerary to the distended and lacerated parts. *H. pubescens*, a variety of *H. antidysenterica*, found in India, and the bark is used as febrifuge, and the seeds in diarrhoea and dysentery.

E.

28. **Eranda : Ricinus**, an apetalous genus, belonging to the family—Euphorbiaceæ, tribe Acalypheæ, and sub-tribe Ricinæ. *R. communis* (Ben. *eranda* ; Eng. castor plant ; Fr. *rinum* ; Ger. *gemeiner Wunderbaum* ; Hind. *anda*), a perennial plant, indigenous to Africa and India, an annual in the sub-tropics, where it is now extensively cultivated for the castor seeds, castor leaves as feed for the silk worms, and as an ornamental shrub.

The oil (*oleum ricini*) pressed from the seeds (large-seeded variety yields heavier and darker oil ; small-seeded variety is preferable) is a mild and efficient purgative, though it has a tendency to produce subsequent constipation, and has the reputation to be a galactagogue, emmenagogue and anthelminthic. It is also used in cutaneous and rectal diseases, and locally applied to prevent alopecia. The leaves are used as galactagogue, either topically applied to the breast, or administered internally ; they are also locally used in skin diseases, abscesses and ophthalmia. A decoction of the root is used in flatulent colic, for neuphritic pains, and in asthma, and the root-bark is reputed to be a drastic purgative.

29. Elā : *Elettaria*, a genus of gingiberaceous plants, of the Order Scitamineæ, indigenous to Malabar and Ceylon. *E. cardamomum* (Ben. sota-elāichā ; Gr. Cardamom-Elettarie ; Hind. soti or sophed ilāchi ; Tel. elāku), a perennial plant, 6-12 feet high, indigenous in Malabar, and cultivated for its fruits (cardamoms) which are aromatic, carminative and are used in atonic dyspepsia, containing 3 to 5 p. c. of essential oil, composed of acetic and formic acids, dipentene, terpineol and cineol. *E. major* (Syn. *Amomum subulatum* ; Ben. bara-elāichā ; Hind. barī-ilāichi ; Sans. elā), a plant growing in Bengal and the East Indies, regarded as a variety of *Elettaria cardamomum*, differing chiefly in the elongated form and large size of its fruits. *Amomum aromaticum* (Fr. amome aromatique ; Ger. gewürzhafte Amome), an annual or biennial plant growing in Bengal and East Indies, from 2 to 3 feet high, with acuminate-lanceolate leaves nearly a foot in length, and pale-yellow flowers. Its seed (Bengal cardamom) is round in appearance, and is believed

by many that the large cardamom (*E. major*) has originated from it.

K.

30. **Kantakāri** : *Solanum*, a genus of dicotyledonous, perigynous, gamopetalous herbs or shrubs of the Solanaceæ (Night-shade family), usually natives of the tropics, comprising about 900 to 1200 species, which all possess more or less in their fruits and herbage a poisonous narcotic principle, *S. indicum* (Ben. vrhati; Hind. varhantā; Eng. Indian nightshade; Tam. cheruchunta; Sans. vārttākī), is a native of India, and a decoction of its root, which is excitant and narcotic, is given in dysuria, ischuria, in difficult parturition, and odontalgia. *S. jacquini* (Ben. kantakāri; Hind. kanteli; Mar. ringanī), is a native of eastern and southern India, and East Indies. The subacid fruit, and the root are used as an expectorant; the stems, flowers and fruits are carminative; the entire plant is diuretic. *S. ovigerum* (egg-plant) whose fruit (Ben. begun; Eng. brinjal, egg-apple; Hind. vantā; Mar. vāge), is eaten as a garden vegetable, is the cultivated form of *S. melongena*, which with *S. insanum*, are the two varieties of *S. esculentum*. *S. esculentum* is a native of southern Asia, and its fruits are used as discutient and anodyne poultice, especially for hemorrhoids. The leaves are narcotic, and are used internally in intoxication, and externally as a soothing poultice. *S. trongum*, a native of Bengal and East

Indies, whose repugnant smelling and tasting root is used as parturient, and in odontalgia. *S. tuberosum* (Ben. gol-ālu; Eng. potato; Fr. pomme de terre; Ger. Kartoffel), is a native of the Andes of Chile, but now extensively cultivated, all over the world, for its tuber, which is a valuable source of food supply, containing about 10 p. c. of nitrogenous matter, 3.2 p. c. of sugar, salts, a little of fat and about 75 p. c. of water. Sprouting, growing tubers, however, are poisonous, as well as the flowers, unripe seeds and the leaves, containing solanine. The growing tuber was used in Europe (*tubera solani tuberosi*) as an antiscorbutic, and in combination with cinchona as an antiperiodic. They have been also employed as an aperient, diuretic, and galactagogue, and nervous sedatives and stimulants in gout. The leaves, in the form of extract (*extractum solani tuberosi*) have been employed as an antispasmodic in chronic cough, producing effects like those of opium. Fortunately the full grown potato-tuber, unless it is sprouting, or has been exposed to the surface while growing, does not contain solanine.

31. **Katuki**: *Picrorrhiza*, a genus of the Scrophulariæ, tribe—Digitaleæ. *P. kurroa* (Ben. katki, titā; Hind. kutki), a perennial herb of the Himalayas, whose intensely bitter thick root, is a tonic, and alterative.

32. **Katbhi**: *Careya*, a genus of myrtaceous plants of the tribe—Barringtoniæ, indigenous to eastern India, East Indies and tropical Australia. *C. arborea* (Ben. katbhi; Hind. karahi) a large tree of Coromandel and Malabar, whose bark is used as an astringent antiseptic.

33. **Kadali**: *Musa*, a genus of monocotyledonous plants of the family Musacæ, and the tribe Museæ, known by its tubular calyx, comprising about 32 species.

M. paradisiaca (Ben. kāchā kalā ; Eng. plantain ; Fr. plantanier ; Ger. gemeiner Pisang), is a native of Bengal and the East Indies, now cultivated throughout the tropics, for its valuable nutritious fruits (containing about carbohydrates 19.82 p. c., albumin 1.15 p. c., fat 0.87, phosphoric acid 0.27, and water 74.2 p. c.), which are usually eaten cooked, or desiccated and powdered, before they are fully mature. Preserved with sugar, plantain is considered antiscorbutic. The juice of the unripe fruit is astringent, and is used in diarrhoea. And the fermented juice of the ripe fruit is given in atonic dyspepsia. **M. sapientum** (Ben. kalā ; Eng. banana ; Fr. bananier ; Hind. kelā ; Tam. pajam) is now regarded as a variety of *M. paradisiaca*, with which it is almost identical, and hardly differing from it except that the *Musa paradisiaca* has purple spots on its stem, and the fruits are a little longer than that of the *Musa sapientum*. Ripe banana is a wholesome, refrigerant and aperient fruit. **M. troglodytarum**, a species found in Bengal and the Pacific Islands, distinguished by numerous seeds in the fruit, which is usually reddish and thick.

34. Kamala : *Nymphaea*, a genus of the Nymphaeaceæ, thalamifloral, dicotyledonous aquatic herbs with peltate or cordate fleshy leaves from a prostrate root-stock. The stems are slightly bitterish and astringent, and contain a faecula, which when properly prepared, may be used as food, and it has the reputation of being sedative. *N. alba* (syn. *Castalia alba* ; Eng. white water-lily ; Sans. kumuda) a common European species, introduced into Cashmere. In Bengal the

Egyptian **Castalia lotus** with white or pink petals, or mixed, is found in shallow autumn flood waters, and its stem is eaten by the poorer classes, and it is regarded as astringent, and refrigerant. **N. cyanea** (Eng. Indian blue water-lily) is found in Indian shallow ponds, especially in Bengal, where the flowers are used as an astringent and refrigerant. **N. edulis** (syn. *N. esculenta* ; Ben. *sota sunndi*), a species of water-lilies found in Bengal and East Indies, whose starchy root, capsule and seeds are used as food and medicinally. **N. malabarica**, a species of water lilies, found in Malabar, where the flowers are used in coughs and gastrorrhagia. **N. nelumbo** (syn. *Nelumbium speciosum* ; Eng. sacred lotus ; Fr. *nelumbo* ; Ger. *prâctige Nelumbo* ; Ben. *padma* ; Hind. *kamala*), a widely dispersed species, found in Egypt, India and China, distinguished by the obconical receptacle, having an edible and refrigerant root, seed, and the carpels of the flowers. **N. pubescens**, a species of lotus, resembling the Egyptian *N. lotus*, indigenous to tropical Africa, Bengal, East Indies and Java. In the East Indies, a decoction of the root, which is edible, is employed in dysuria and hemorrhoids, and the leaves, in the form of a salve in ophthalmia. **N. rubra** (Sans. *rakta-padma*), a species indigenous to India, but considered by some as a variety of the Egyptian *N. lotus*, and the root, seeds and capsules are used as food, and the starch obtained from the root and the underground stamens are employed both as an aliment and as medicine. **N. stellata** (Sans. *nîla-padma* ; Eng. Blue lotus), a species indigenous to India, and in Malabar, the flowers are used as an antemetic, and in coughs and dysuria, and the seeds in diabetes.

35. Kapittha : Feronia, a genus of aurantiaceous trees, indigenous to India, Ceylon and the East Indies. *F. elephantum* (syn. *asinifolia* ; Eng. elephant or wood apple ; Fr. *feronia geant* ; Ger. *Elephantenapfel* ; Ben. *kayet-bel* ; Hind. *Kaitha* ; Mar. *kavit*), a thorny tree, indigenous to India, Ceylon and the East Indies, with pinnate leaves and white flowers, bearing an acid edible fruit, which in the jelly form, is given in diarrhoea and dysentery. The gum obtained from the stem, is used for the same purpose. The leaves smell like anise, and are used as a carminative in the intestinal troubles of children. *F. pellucida* (syn. *Ægle marmelos*, *Crataeva marmelos* ; Ben. *bel* ; Eng. Bengal quince ; Hind. *bel* ; Tam. *bilva-pajam*. Sans. *bilva*), a large thorny tree, a native of tropical India, with trifoliate leaves, and bearing hard-shelled apples, which are golden colored, when ripe, and weigh from two to five pounds. Unripe fruits are given after roasting in jelly form, as a specific in diarrhoea and dysentery, and the ripe fruit in intestinal troubles. Where fresh fruits are not available, unripe dried fruits (*Belæ fructus*) are given as *extractum belæ liquidum* (Br. ph.).

36. Karkatī : Cucumis, a genus of the Cucurbitaceæ, containing 25 species, natives of warm regions, which are all annual or perennial herbs with hairy stems and leaves, running over the ground or climbing. *C. anguinus* (Fr. *concombre serpent*, Ben. *Kākura* ; Sans. *chirvite*), a species found in Eastern Bengal and the East Indies, remarkable for the long and the serpentine form of its edible vegetable fruit. It is regarded diuretic and aperient. *C. citrulus* (Ben. *tarmuja* ; Eng. water-melon ; Fr. *melon d'eau pasteque* ; Ger. *Wassermelone* ; Hind.

tarvuj; Sans. kālinda), a native of southern Asia, now cultivated in all warm regions. Water-melon is diuretic, and its seeds are vermifuge. **C. melo** (Ben. kharvvuja; Eng. musk-melen; Fr. cataloup; Ger. Melonengurke; Hind. kharvuja) a species, indigenous in southern and western Asia. The fruit is appetizing. Its seed (semen melonis) is reputed to be an anaaphrodisiac, and formerly it formed the principal ingredient of the official *quatuor semina frigida majora*. **C. sativus** (Ben. sasā; Eng. cucumber; Fr. concombre ordinaire ou commun; Ger. Gartengurke, Kurkumer; Hind. khīrā; Sans. trapusa) is a native of southern Asia; its fruit is highly esteemed as a garden vegetable, when young it is eaten raw; its pulp is regarded emollient. And its seeds used to be regarded as an anaaphrodisiac, and formed part of *quatuor semina frigida majora*. **C. utilissimus** (Ben. kākura; Sans. karkatī), a species cultivated in Bengal as a garden vegetable, and is regarded diuretic.

33. Karkata-srngī: Gall-nut on *Rhus succedenea*, or *Tamarix orientalis*. Gall-nut is a vegetable excrescence, produced by deposit of the egg of an insect in the bark or leaves of a plant, ordinarily due to the action of some virus deposited by the female along with the egg, but often to the irritation of the larva. Galls are nearly spherical in shape, and vary in size from a small pea to that of a hazel-nut, and they are of blue, black or deep-olive color. Galls are inodorous and have a bitter astringent taste, containing about 75 p. c. tannic, gallo-tannic and gallic acids, the latter of which is perhaps produced by the fermentative changes taking place in the tannic acid of the plants. The gall on *Rhus succedenea*

is produced by the puncture of *Ahis chinensis* in Bengal, and in northern India on *Tamarix orientalis* by *Quercus lusitanica*. The gall is a cholagogue.

38. Karpura : Cinnamomum, a genus of the Lauraceæ of the family—Persicæ, comprising about 50 species, all natives of tropical Asia and characterized by having polygamous Polynesian islands, or hermaphrodite flowers, a six-cleft perianth, nine stamens with four-celled anthers, ribbed ever-green leaves, and an aromatic volatile oil. *C. camphora*, an ever-green of considerable size, indigenous to Formosa and maritime regions of southern China. The product termed *camphor* (Ben. karpura ; Fr. camphre ; Ger kampher ; Hind. kapur) is found as a concrete volatile oil (stearoptene), is found diffused throughout all parts of the tree, especially in the root and the smaller branches, and it is obtained by distillation of the wood with water, and by sublimation. Borneo or Barus camphor is found in solid crystalline lumps in fissures, cracks or cavities in the trunks of *Dryobalanops aromatica* (syn. *D. camphora* ; Fr. camphrier ; Ger. kampherhaltige Flügeleichel), belonging to the genus *Dipterocarpeæ*. Camphor is the dextro-gyrate modification of the saturated ketone, and is lighter than water, and thrown into water, it exhibits peculiar giratory movements. It is soluble in alcohol, fixed and volatile oils, and very lightly in water. It is aromatic, and imparts to the mouth a sensation of pleasant warmth, followed by coolness. And it is thought to possess stimulant, antispasmodic and anodyne properties. It is a valued sedative in allaying abnormal nervous excitability, sexual erethism, and pains attending menstruation. Taken in excess, however, it acts as an irritant narcotic poison, producing epigastric pain,

nausea, vomiting, maniacal delirium and convulsions. When applied to the skin, camphor slightly irritates and reddens the surface, diffusing to a certain extent, thus producing the local sedative effect. It is a valuable household remedy for headaches and various neuralgic pains, and the camphorated water may be sprinkled over handkerchief, or the flannel bandage. *C. zeylanicum*, a species indigenous to Ceylon and the Malabar coast, and whose bark is the official cinnamon (Sans. tvak ; Ben. dāru-chini ; Fr. cannelle ; Ger. zimmt ; Gr. kinnamomon ; Hind. taj-dālchini). Ceylon variety of cinnamon is regarded as the best, containing more sugars and aromatic principles. Cinnamon is an astringent aromatic, hemostatic, stomachic, carminative and counter-irritant. *C. loureiri*, a tree indigenous in Cochin-china, and cultivated in southern China, whose bark gives an excellent cinnamon, and whose leaves are also very aromatic and known as *patra* (Ben. teja-patra ; Hind. tej-pāth) and used as a condiment in cooking. It may be adulterated with the leaves of the allied species. *Laurus cassia* (Fr. laurier cassia) of Linneus is not well defined ; and it is identified by some with *C. zeylanicum* and by others with *C. aromaticum*, which is a south Chinese species. *C. loureiri*, which bears genuine cinnamon *flores cassiae* is therefore likely to be the tree whose leaves were known as *patra*.

39. **Karanjā : Pongamia glabra**, a medium sized tree, belonging to the genus $\frac{1}{2}$ Leguminosæ, indigenous to tropical Asia and Australia (Ben. kātā karanjā ; Eng. Indian beech ; Hind. karanjā). Its seeds yield a yellowish brown oil (pongam oil) which is used externally in rheumatism, and is specially recommended in chromophytosis and other parasitic skin diseases,

as well as cutaneous affections. The juice of the fresh root is used internally in gonorrhea and urethritis, and is applied in ulcers and fistulous tracts. The leaves are used in children's intestinal troubles, especially in diarrhoea. Dried flowers, in powdered form in combinations with other ingredients is given as a decoction in diabetes to quench thirst. **Cæsalpinia bonduc** (Ben. dahara-karanjā; Tel. kochkai; Sans. karanji; Fr. bonduc jaune, *Guilandina bonduc*), a prickly trailing shrub, belonging to the leguminous genus, and the sub-order *Caesalpinia*, growing in the maritime regions of all tropical countries. The fruit is a flattened prickly pod, containing from 1 to 3 very hard yellow seeds (nicker-nuts, bonduc seeds, Molucka beans) which are very bitter, and are used in India as a tonic, antiperiodic and anthelmintic; the seeds contain an oil (nicker-nut oil) which is used in paralysis and convulsions. In Cochin-China, the leaves are used as a deobstruent and emmenagogue, and the root as a gastric tonic and astringent. **Cæsalpinia bonducella** (syn. *Guilandina bonducella*), an allied species resembling *C. bonduc*, found side by side, but differing in its grayish lead-colored seeds and the geminate prickles on the leaves. Medicinally both the species are used for the same purpose.

40. **Karira**: *Capparis aphylla*, a desert shrub of Rajputana, belonging to the genus *Capparidææ*, distinguished by 4 sepals, 4 petals, numerous stamens and stalked bacciform fruit, which is incompletely, or not at all, dehiscent. Its buds and fruits are eaten, especially in the form of a pickle, and the plant is used for boils, eruptions, and diseases of the joints, and as an antidote to poison.

41. Karamardda : Carissa, a genus of spiny shrubs of the tribe Carisseæ, indigenous to tropical Africa, Asia and Australia. **C. carands** (Sans. karamarddikā ; Hind. kārondā ; Mar. karavandī) a thorny shrub growing throughout Indian plains. The fruit is stomachic and is used in biliousness, the unripe fruit is astringent. **C. diffusa** (Sans. karamardda ; Ben. karamchā), a thorny shrub, grows in Bengal and southern India, bearing an edible black fruit, larger in size than Karamarddikā. The ripe fruit is acid and astringent, and is used as a stomachic.

42. Kadamva : Nauclea, cadamba, a rubiaceous tree, belonging to the sub-tribe Cinchonaceæ, indigenous to tropical India, especially in Bengal, and the juice of its capsule is used in Malabar in colic.

43. Karnikāra : Pterospermum, a wing-seeded genus of the Helicteræ, comprising about 16 species, all natives of tropical Asia. **P. acerifolium** (Sans. karnikāra ; Mar. laghu-vāhavā ; Ger. ahornblättriger Flügelsamen), a species found in western India, and the flowers of which are used in gastralgia, leucorrhœa, and the bruised leaves as a hemostatic. **P. heyneanum** (Ger. heyne's Flügelsamen), a species found in Bengal and the East Indies, where the flowers are used in leucorrhœa, and the powdered leaves are smoked like tobacco in nervous headache. **P. suberfolium**, a species found in southern India, resembling *P. heyneanum*, and the flowers of which are used in migraine.

44. Karkotaki : Momordica, a genus of the climbing herb of Cucurbitaceæ. **M. charantia** (Sans. kārabella ; Ben. karlā ; Hind. karelā ; Fr. momordique charantia ; Ger. gurkenähnlicher Balsampfel), is a species

native to Bengal and the East Indies. In Bengal, the bitter fruit is cooked and eaten, and is regarded as tonic, appetizing and stomachic. In the East Indies, the whole plant, made into an ointment with cinnamon, long pepper, rice, and the oil of *hydrocarpus kurzzi* (*chaulmugrā*) is employed as an external application in leprosy, malignant ulcers, scabies and cutaneous affections. The leaves are anthelmintic. **M. dioica** (Sans. *karvelli* ; Ben. *uchche* ; Mal. *erimapasel* ; Tam. *pālupāgel* ; Tel. *angākarā*), a species found in tropical India and the East Indies. The fruit is cooked, eaten, and is regarded as appetizing. The root is used in hemorrhoids. **M. mixta** (Ben. *gol-kakrā*), a species found in Bengal and East Indies, with red prickly fruits, the yellow insipid pulp of which is used as a vegetable food. **M. monadelpha** (Syn. *cephalandra indica* ; Sans. *bimbi* ; Ben. *telākuchā* ; Hind. *kanduri*) a climbing plant, indigenous to the Cape of Good Hope and the tropical India where the root and the leaves are employed in small-pox and inflammatory fevers. To the bright-red fruits of *Momordica monadelpha*, woman's lips (*bimbos-tham*) have been often compared in Sanskrit classics.

45. Krtavedanā : *Luffa*, a genus of dicotyledonous charipetaleous plants of the Cucurbitaceæ, comprising about seven species, all natives of the tropics, characterized by staminate flowers growing in racemes, the petals without glands, and the fruit opened by a lid at the apex, is dry, oblong in shape, the numerous seeds being located in a network of coarse and strong fibers, which in some species are capable of being detached entire, cleansed of all matters, and used like a coarse, tough fabric. **L. acutangula** (Sans. *dhamargava* ; Ben. *jhinge* ; Ger *scarfeckige Gurke*), a species indigenous to southern Asia,

especially in Bengal. Its fruits when half-grown and if tender, are edible, if well-cooked ; when ripe they are emetic. The oil of the seeds is used in cutaneous complaints, and the root is laxative, and is especially used in dropsy. *L. ægyptica* (Sans. mahā-kosātaki ; Ben. dhudhul ; Eng. wash-sponge ; Hind. nenuyā) a species found in Egypt, Arabia, and India, and its fruit is edible if half-grown and tender. *L. amara* (Sans. krtavedhana ; Ben, sveta-puspa ghosa ; Fr. luffe amere ; Ger. bittere luffe) a species found in Bengal and the East Indies, the fruits of which are violently emetic and cathartic. *L. bandaal*, an allied species found in northern India, and its fruit is considered a powerful drastic in dropsical complaints. *L. echinata* (Mar. kukarvela), a species found in western India, which is intensely bitter, and is used as an emetic and purgative in certain compound decoctions. If taken alone, it causes symptoms, like those of cholera.

46 **Kastūrī** : Musk is the dried secretion from the preputial follicles of *Moschus moschiferus* (Artiodactyla ruminantia of Family Moschidæ) or musk-deer who inhabit the high mountain regions from Tibet to Siberia. The musk-deer is about three feet in length, with the limbs, especially the hinder ones, long and slender, the ears large, and the tail rudimentary. The long coarse hair covering its body, is extremely brittle. The male animal is the source of the musk. This is contained in an oval, hairy, projecting sac, as large as a small orange, situated between the umbilicus and the prepuce, and lined internally by a smooth, irregularly folded membrane, which secretes the musk. The best variety is the Tonquin musk. It is of dark-purplish, or reddish-brown colour, and has a bitterish taste, and a peculiar, penetrating,

persistent and diffusive odor. Musk contains ammonia, cholesterin, fat, a bitter resinous principle, and various principles. The odorous principle is probably a product of decomposition, constantly being formed, as complete drying destroys it, and it returns when the moisture has been added. Musk is a diffusible stimulant, antispasmodic and aphrodisiac. It creates a sensation of heat in the stomach, and in some persons excites nausea and vomiting. Headache and giddiness are also produced with the stimulation of sexual appetite. A primary excitement of the central nervous system is succeeded by a more or less marked soporific effect. Musk has been used with benefit in collapse of typhoid, low fevers, hiccough, delirium tremors, and in many of the manifestations of hysteria, as the emotional crises, palpitation of the heart or spasm. It is also reputed to stimulate the respiratory centre. Musk is also largely used in perfumery, its aroma being very lasting and holding more evanescent perfumes with it.

47. **Kakajangā** : *Leea*, a genus of the *Leeaceæ*, Tribe—*Ampelideæ*. *L. macrophylla* (Ben. *tulsumudryā* ; Hind. *dhol-sumudra*), a species indigenous to tropical India and the East Indies, the astringent and mucilaginous root of which is a specific in ringworm. *L. staphylea*, a species about 12 feet high, growing in Malabar, the root of which is used in colic, intestinal complaints, the leaves as a digestive tonic and externally in gout, and the wood in decoction to relieve thirst in fevers.

48. **Kakanāsa** : *Hygrophilla*, a genus of dicotyledonous sympetalous. *Acanthaceæ*, tribe *Ruellieæ*, comprising about 30 species, all natives of the tropics and the subtropics, characterized by a calyx of 5 narrow

nearly equal divisions, a bilabiate corolla, 4 perfect didynamous stamens, entire opposite leaves and axillary sessile or subsessile flowers. *H. obovata* (Ben. *kāknāsā* ; Hind. *kouyā dori*), a species found in tropical India and the East Indies, the leaves of which are used to reduce edematous swellings. *H. ringens* a species found in Malabar, where the leaves are used together with salt as a depurative. *H. spinosa* (Syn. *H. longifolia* ; Ger *langblättriger Sterndorn*), a prickly species, found in Ceylon, Bengal and the East Indies. Its root and leaves are tonic and diuretic, and the seeds diuretic and aphrodisiac.

49. **Kākoli**: *Gymnema*, a genus of twining asclepiadaceous dicotyledonous, sympetaleous shrubs, usually with milky juice, pollen in waxy masses, the pollinia attached in pairs to glandular appendages of the stigma, fruit a pair of follicles and the seeds comose, natives of tropical Africa and India. *G. aurantiacum* (syn. *Leptadenia reticulata* ; Sans. *medā*), a twining leafy species growing in Southern India, Ceylon, Burma and Singapur, characterized by double crown, rotate corolla with filiform lobes, and the tubor is milky, white and globular, and hence the genus has been named *leptadenia* from. Gr. *leptos*=peeled, + *aden*=gland, from its appearance. Its tubor is eaten as a vegetable, and used medicinally as a restorative. *Leptadenia spartium* (Sans. *mahāmedā*), an erect glabrous species, with long twiggy branches, either leafless or bearing narrow linear leaves, found in Egypt, Arabia, Senegambia and the North-Western Himalayas. Its tuborous root is larger, and is used as the above. *Gymnema balsamicum* (syn. *Pluchea indica* ; Sans. *kākoli*), an aromatic, stimulant,

and vulnerary species, growing in Malabar, Ceylon, Java and Luzon. *G. lactiferum* (Sans. ksira-kākoli ; Eng. Ceylon cow-plant), a species growing in Ceylon, furnishing a white pleasant juice, used as a substitute for cow's milk. The leaves are eaten as a vegetable. *G. malayanum*, a variety of *G. lactiferum* growing in the Malay Peninsula. *G. silvestre*, a species found in the Coromandel Coast and Ceylon, where the bitter root is used in snake-bite. The leaves are bitterish, astringent, and acidulous, containing gymnemic acid, and if they are chewed, the power of tasting sweet or bitter substances are temporarily destroyed.

50. **Kāmpilla : Melilotus**, a genus of leguminous annual or biennial herbs, belonging to the clover family—*Trifolieæ*, comprising about 20 species, natives of subtropical Eur-Asia, distinguished by pinnately trifoliate leaves which have adnate stipules, and small white or yellow flowers growing in loose racemes. *M. hamatus* (Mar. aklula mulka), a species growing in Arabia and Sind, whose seeds are used as deobstruent, astringent and alterative. *M. indica* (syn. *parviflora*) the scented trefoil sweet-clover, found in Nilgiris and Australia, and used for coughs. *Mallotus philippinensis* (syn. *Rottlera tinctora* ; Fr. rottleres des teinturies ; Mar. kamilā ; Ben. tunga). a species growing in Abyssinia, Southern Asia and Australia. The glands and the hairs of the fruits, known in commerce as *kamala*, are actively cathartic and a very efficient taenifuge. It is also used for dyeing silk a rich orange-brown color, and as an external application is various skin diseases, especially scabies.

51. **Kānchanāra : Bauhinia**, a genus of leguminous plants of the family *Caesalpiniaceæ*, tribe *Bauhiniæ*,

mainly consisting of tropical species under 9 distinct sub-orders, which are usually twining vines, often stretching from tree to tree like cables, and distinguished by having their leaves consisting of two lobes or parts (Sans. yuga-patraka). **B. Acuminata** (Sans. gandāri ; Eng. mountain ebony ; Fr. bauhinie a aiguillons ; Hind. kachnār), a small tree growing throughout India, East Indies, China, and cultivated in all tropical countries ; its flowers are laxative, and the decoction of its root-bark is used as an anthelmintic and carminative. **B. anguina** (syn. *B. scadens*, *Lasiobema anguina*, Sans. garuchi ; Ben. ghora gulancha), a glabrous climbing plant, found in Eastern Bengal, Burmah and East Indies, growing to a great height upon trees, and enveloping them like a coil of rope. It furnishes a gum which is used in making ink, and the decoction of its bitter root is used as an antipyretic. **B. macrostachya** (syn. *B. scadens* ; *Phanera macrostachya* ; Ben. gurūchi), a glabrous climbing plant, allied to *B. anguina*, found in Sylhet and Assam ; its juice is used in skin lesions. **B. Purpurea** (Sans. kanchanara ; Beng. rakta kanchana), an erect tree of medium size, found in India, Ceylon and China. The bark is used as a tonic, alterative and astringent. It is also used as an astringent vulnerary in cutaneous affections. **B. tomentosa** (Sans. kobidara ; Ben. pita-kanchana), a species growing in tropical Africa, India, Ceylon, East Indies and China ; an erect shrub with pubescent branches bearing hairy leaflets and pale-yellow, crimson-spotted flowers. The dried leaflets and buds are used in dysentery, and a decoction of the root-bark is employed as an anthelmintic and a remedy for hepatic disorders. **B. vahlīi** (syn. *B. racemosa* ; *Phanera vahlīi* ; Eng. maloo climber ; Beng.

latā gulancha), a gigantic climbing plant with pubescent branches and racemes of white flowers, growing in tropical India. It often reaches length of more than 300 feet, often climbing to the tops of tall trees as mangoes, and occasionally causing their death by strangulation. The seeds are eaten raw ; ropes are made from the bark ; and the large leaves are used in wrapping packages. **B. variegata** (syn. *Phanera variegata* ; Beng sveta-kanchana ; Eng. mountain ebony ; Fr. bauhinie panachee ; Sans. karvvadāra), a tree about 20 feet high, growing in tropical India, East Indies and China, bearing bifoliate leaves and rose-white flowers disposed in pairs. The wood is of dark color, and is called ebony. The bark is used as tonic, astringent and alterative internally, and externally in scrofula, ulcers and cutaneous affections.

52. **Kārpāsi :Gossypium**, a malvaceous genus of herbs and shrubs, comprising ten species, all natives of the tropics, and important as yielding the cotton of commerce, and they are distinguished by having 3-to-5 lobed leaves, showy axillary flowers surrounded by three large cordate bracts and 3-to 5-celled capsule, and the seeds densely covered by long wooly hairs. **G. arboreum** (syn. **Bombax malabaricum** ; Ben. simūla ; Eng. silk-cotton tree ; Fr. cotonnier arborescent ; Sans salmali), a large tree, indigenous to Bengal and the East Indies, distinguished by having dark-green leaves, large, beautiful, but inodorous red-purple blossoms, and producing *silk-cotton* which is extensively used in stuffing cushions, mattresses, and in the manufacture of glossy fabrics. The bark is used externally in inflammations and cutaneous eruptions, the root-bark as an emetic, the leaves

in diarrhœa, and the nectar of the flowers and the gum-resins of the tree (Ben. moch-rasa) as a laxative and diuretic. **G. herbaceum** (Ben. karpasa ; Eng. cotton plant ; Fr. cotonnier herbace ; Ger. Baumwollpflanze ; Hind. kapas), a species indigenous to India and has been from the earliest ages. It is the chief source of cotton in India, and it has been also introduced in the Southern United States. It is a perennial plant, but in cultivated form, it is grown annually, and it has developed numerous varieties. It is 2 to 6 feet high, with palmate leaves, and yellow axillary flowers with a purple-spotted petal ; the capsule contains 5 seeds, clothed with gray down under the white wool. The seeds furnish cotton-seed oil, and after expression of the latter, are used as oil-cakes, either for fattening the cattle or for manuring. The leaves are used as demulcent, and the root in decoction as an emmenagogue, abortifacient and parturient. **G. indicum** (cotonnier de l'Inde ; Ger. indische Baumwollenstaude), a cultivated variety of *G. herbaceum*. **G. religiosum** (Fr. cotonnier des nonnes ; Ger. chinesische Baumwollenstaude), a perennial shrub, cultivated near the temples or in the courtyards, indigenous to southern China and Bengal. In Bengal, the widows make sacred thread out of its wool. *G. vitifolium*, a species indigenous to Egypt and Sind.

53. Kunkuma : Crocus sativus (Ben. kunkuma ; Eng. saffron ; Fr. safran ; Ger. Safran ; Hind. kesara, japhran), a beautiful iridaceous autumnal dwarf herb, possibly a native of Levant, where it has been for long cultivated, and now introduced into Cashmere, characterized by a fleshy, fibrous-coated bulb-like corm, grass-like leaves appearing after the handsome large purple flower

with three orange-red convoluted stigmata, protuding beyond the perianth, and the perianth funnel shaped with a long slender tube. It takes about 4000 stigmata to make one ounce of commercial saffron. Saffron has a peculiar aromatic odor, and a bitter pungent taste. It is slightly antispasmodic and anodyne. But it is especially used as a condiment, and for its beautiful coloring matter. It contains besides wax, gum etc., picrococin—a bitter principle, 65 p. c. of polychroite on which its coloring power depends and which crocin on decomposition, and an essential oil to which the light stimulant and antispasmodic properties of it are due

54. Kāsa : Saccharum. a genus of grasses of the tribe Andropogonæ, type of the group Sacchareæ, comprising 12 species, all natives of the tropics. They are tall grasses with leaves which are flat or convolute when dry, and flowers in large terminal panicles, densely sheathed with silky hairs. Of them commercially the sugar cane is the most important. *S. officinarum* (Eng. sugar cane ; Fr. canne à sucre ; Ger. achtes Zuckerrohr ; Ben. aukh ; Sans. ikṣu), a native of Bengal, Malay Archipelago and Indo-China, and now cultivated in all tropical and subtropical regions for the sugar, which is manufactured by evaporation of the expressed juice. The juice of the sugar cane as well as the root are used as a diuretic. *S. sara* (Ben. sara), the pen-seed grass of Bengal, whose smoke is applied to burns and scalds. *S. spontaneum* (Sans. kasa ; Ben. kese , Eng. thatch grass) a species found in Bengal and the East Indies, and its root is used as a galactagogue and diuretic.

55. Kusa : Andropogon, a genus of perennial grasses of the tribe Sacchariæ, distinguished by bearing

a pair of spikelets at each joint of the rachis—one mounted on a pedicle, the other sessile, and containing two flowers, of which the upper one only is fertile. Both rachis and flowers are hairy. *A. citratum* (syn. *A. citratus*; Ben. *gandhu-khar*; Eng. *lemon-grass*; Hind. *bhutrn*; Sans. *Bhustrna*), a species indigenous to Bengal and Travancore, and cultivated in Coromandel. The leaves are fragrant, aromatic and bitter, and yield an essential oil. The oil of the first distillation, is high-colored and is called *lemon-grass oil*; redistilled with charcoal, it becomes clear, and is called *essence of verbena or citronelle*. The oil is used externally in rheumatism, and internally in cholera. A tea made from the leaves is used as stomachic tonic, a diuretic and refrigerant. *A. iwarancusa*, a species found in the north-western mountains of India, resembling in appearance and taste *A. citratum*, but containing no oil, and its root is used for intermittent fever. *A. martini* (Sans. *sougandhika*; Eng. *ginger-grass*), a species found in the highlands of India, yielding a highly rubefacient, aromatic straw-colored volatile oil (*ginger-grass oil*), closely resembling *lemon-grass oil*, and is used in rheumatism and as a tonic for the hair, and to prevent it from falling out after acute diseases. The grass also furnishes fibers for making paper. *A. muricatum* (syn. *A. muricatus*, *A. squarrosus*, *Phalaris zizanoides*, *Agrostis verticillata*, *Vetiveria odorata*, *Anatherum muricatum*; Ben. *khus-khus*; Tam. *veti-veā*; Eng. *cuscus-grass*), a species growing in tropical India and East Indies. Its root is antispasmodic, diaphoretic, diuretic and emmenagogue. The root is also used in bilious affection, and as a cooling application on the skin against insect

bites, and the infusion of the root is used as a refreshing and stimulating drink. **A. pachnodes** (Sans. *erakā* ; Mar. *mothī-trna*), a species found in western India, furnishing a volatile oil, resembling that of *A. citratus*, and is used as a counter-irritant in rheumatism and neuralgia. **A. schœnanthus** (syn. *Cymbopogon shoe-nanthus* ; Sans. *kattṛna* ; Ben. *rām-karpura* ; Hind. *rohis* ; Eng. *sweet-rush*), a species found in northern India, yielding *roshé oil* used for adulterating attar of rose. Its root is regarded as expectorant. **A. serratus** (*A. filiform.* *Lepeocercis serrata*), a species found in Bengal and East Indies, and its root is used as a carminative. **Poa cynosuroides** (Sans. *kusa* ; Hind. *kusā* ; Eng. *sacred kusa grass*), a species found all over India, and its root is regarded as litholytic.

56. **Kukundara** : *Blumea*, a genus of composite herbs growing in tropical Africa and India. **B. aurita** (Sans. *kukundara* ; Ben. *kukur-sokā* ; Hind. *kukurondā*), a species found in eastern India, of terebinthaceous odor, and is used in dyspepsia. **B. balsamifera**, a tall species growing in Cochin-China, emitting camphoraceous odor when bruised, and yielding Nagi camphor on distillation. **B. lacera**, an allied species of *B. aurita*, and possesses the same properties.

57. **Kasīsa** : *Iron sulphate* (Fr. *sulphate ferreux* ; Ger. *schwefelsaures Eisenoxydul*), occurs in light green, monoclinicprismatic crystals, efflorescing on exposure to the air, and having an astringent saline taste. It is also known as *green vitriol*.

58. **Kundurū** : *Indian olibanum* (franc incense of the Bible), the gum-resin of *Sallakī* (*Boswellia serrata* ; syn. *B. thurifera* ; *Olibanus thurifera* ; Fr. *Boswellie dentelee* ;

indischer Weihrauchbaum), a tree growing in the mountains of Central India and on the Coromandel Coast. Olibanum occurs in commerce in translucent tears or in irregular lumps, dull-waxy yellowish or brownish in color. It has a terebinthinous bitterish, but pleasant taste, and balsamic odor, especially when burnt. It contains a large proportion of gum, 52 to 75 p. c. of resin. 5 to 8 p. c. of a colorless volatile oil, containing *olibene*. It is chiefly used as an incense, but also as an expectorant internally, and externally in gangrenous sores.

59. **Kubjaka** : *Rosa*, a genus of shrubby prickly plants of the family—Rosaceæ, having the polypetalous regular flowers, stamens indefinite and perigynous, the carpels distinct or solitary, and the seeds exalbuminous. *R. damascena* (damask rose), a tall cultivated variety with light-red flowers, hardly known in the wild state, is cultivated for the production of rose water and oil of rose, from temperate Europe to the East Indies. *R. indica* (Bengal rose), the parent of some varieties of the sweetest-scented roses, cultivated from upper India to China for the petals which yield the precious Indian *attar of rose*. *R. mochatata* (musk-scented rose ; Sans. kub jaka ; Fr. rosier musque ; Ger. Bisamrose) a shrub indigenous to northern Africa and north-western India, and cultivated for the production of *attar*. Red rose contains tannic and gallic acids and a volatile oil. Preparations of rose are somewhat astringent. They are chiefly used as agreeable flavoring agents and vehicles.

60. **Kurantaka** : *Barleria*, a genus of acanthaceous plants of the tribe—Justicieæ, subtribe—Barlerieæ. *B. buxifolia* (San. vana ; Beng. nila-jhati) ; a small prickly

under-shrub, with hairy branches, growing in the South Deccan, and its root is used as an aperient. **B. cristata** (Syn. *B. napelensis*), an under-shrub growing in Northern and Central India, and cultivated in the East Indies and South China, having purplish-blue (the variety having purplish-blue flowers is known as Sans. *kurantaka*) or white flowers (Sans. *saireyaka*) in capitate spikes, and oblong or elliptical acute leaves. **B. mysorensis** (Syn. *Dicranacanthus spinaceylonica* ; Sans. *sahachara*), a small very prickly shrub with hairy branches, elliptical hairy leaves, and axillary, sessile, hairy flowers, growing in the south Deccan and Ceylon. Its root is used as an aperient. *B. pupiflora* (syn. *B. prionitis*, *Prionitis hystrix*, *Justicia appressa*, *Barreliera prionites* ; Sans. *kuruvaka* ; Ben. *rakta-jhati*), a shrub from 2 to 5 feet high, usually densely armed with prickles, growing throughout India, Ceylon and the East Indies. The expressed juice of the leaves is used as emollient and in catarrh. The ashes of the plant are used in dropsy.

61. **kustha** : *Haplotaxis*, a genus of the *Compisitæ* ; tribe—*Cyniaroideæ*. *H. auriculæ* (syn. *Saussurea lappa* ; Sans. *puskara* ; Cash. *patala-padmini* ; Hind. *pohakaramula*), the root of which is aromatic, stomachic and tonic. *H. costus* (syn. *Costus speciosus* ; Sans. *kustha* ; Ben. *kura* ; Hind. *kustha* ; Fr. *costus elegant* ; Ger. *practige Kostwurz*. Gr. *kostos*), a species found in Cashmere and its root was the *kostos* of the ancient Greeks, *radix costi odorati* of the Romans, and it is a stimulant and aphrodisiac. It is also used as an incense. Conserve is made of it in Cashmere.

62. **Kusumbha** : *Carthamus tinctorius* (Ben. *kusum*. Eng. *safflower*. Fr. *carthame*, *faux safran* ; Ger.

Farbersafflor ; Hind. kasuma), a thistle-like herb, a foot or two high, somewhat branching above, having flowers of saffron-yellow color, turning gradually into orange-red and reddish, formerly brought from Egypt to India, but now extensively cultivated in all tropical and sub-tropical climates. Its root is used as a diuretic. But it is chiefly and extensively used in China and India in dyeing silk, but being replaced by anniline dyes. As a dye-stuff, it imparts bright but fugitive tints of red in various shades containing carthamin. But it is much employed in the preparation of the rouge, and serves to adulterate saffron. Lighting and culinary oil is expressed from its seeds.

63. Kupilu : *Strychnos*, a genus of dicotyledonous sympetalous plants of the family—Spigeliaceæ, tribe Strichnæ, characterized by flowers with valvate corollalobes, and usually two-celled ovary which becomes in fruit an indehiscent berry, commonly globose and pulpy with hardened rind, and comprising about 65 species, all natives of the tropics. *S. minor* (Sans tinduka), a Malabar species, the fruit of which is externally used in mania, the root-bark internally in diarrhoea and colic, and externally in rheumatism. *S. nux vomica* (San. visatendu ; Ben. kuchila ; Fr. noix vomique ; Ger. gemeiner Brechnussbaum ; Hind. visa-tenda), a species growing nearly 40 feet high in India and the East Indies, and its fruit is known as the *nux vomica*, which yields about 1. 25 p. c. of strychnine. The seeds are disk-shaped, about an inch in diameter, covered with silky hairs, of greenish-gray color, and grayish-white internally. It is inodorous, but of extremely bitter taste, and contains strychnine, brucine, igasuric acid, besides fixed

oil, tannin and other substances. Strichnine is a stimulant to the respiratory and vasomotor centres. In minute doses, strichnine increases appetite, improves digestion, excites peristalsis, stimulates the genito-urinary systems, favors the occurrence of menses and acts as an aphrodisiac. But as strychnine is slowly absorbed and eliminated, repeated doses or a relatively large dose is easily apt to cause strychnine poisoning and cause death with tetanic symptoms from asphyxia. **S. potatorum** (Sans. jalada), a non-poisonous species, growing in India the East Indies, and its nuts are used to clarify foul and dirty water; the fruit is emetic and antidyenteric. Powdered seed mixed with honey is applied to boils to hasten suppuration.

64. **Kemuka** : **Colocasia**, a genus of the plants belonging to the family Araceæ, natives of Eastern India and the East Indies. Some of the species are herbs with edible tuberous root, containing much starch, and young leaves are also edible as vegetable. Some have pretty fragrant flowers, and the fruits are berries enveloped by the tube of the spathe and consist of small oblong grains with juicy epiderm. **C. antiquorum** (Ben. kachu; Fr. colocasie de l' Inde; Ger. schildformiger Arum), a species found and cultivated in Eastern India and the East Indies, having many varieties, among which *beuchloa*, *g fontanesi*, *d illustris* and *e acris* were formerly regarded as distinct species. It is acaulescent with peltate, oval, repand leaves, and a cylindrical spathe much longer than the spadix. The juice of the leaves is styptic. Some of the varieties are edible, the young leaves being cooked and eaten, and the tubers (Sans. mānaka; Ben. mānkachu) supplying sweetish starch, or

cooked as vegetable. The chief of these edible varieties are the *Arum esculentum* and *Caladian esculentum* (Fr. chou caraïbe ; Gr. essbarer Aron). *C. indica* (syn. *Alocasia indica*) a species growing in Cochin-china and Java, and cultivated in Bengal for its esculent stems and small pendulous tubers.

65. Kaseru : Scirpus, a genus of monocotyledonous plants, including bulrushes and clubrushes, type of the tribe—Scripææ, in the family Cyperaceæ, comprising about 200 species, distributed widely in tropical and subtropical regions, annuals or strong perennials, characterized by creeping root-stock, small many-flowered roundish spikelets with imbricated and numerous glumes, each flower bisexual and usually with six brislets, representing a perianth, and surrounding the ovary from which the continuous and slender style falls away without leaving any tubercle. *S. articulatus* (Sans. Chichora ; Ben. laghu kesura ; Hind. chichora), a species found in eastern India and the East Indies, and the root of which is a mild purgative. *S. tuberosus* (Sans. rāja-kaseruka ; Ben. mahat-kesur), a species found in tropical India and China, bearing at the tips of its rootlets starchy edible tubers (water or ground-chestnuts), which are regarded as laxative and aperient.

66 Kola : Zizyphus, a genus of dicotyledonous plants of the family—Rhamaceæ, type of the tribe Zizyphææ, comprising about 40 species, native chiefly of tropical Asia and America, characterized by thorny branches, triple-nerved leaves, and cymose flowers, each with five petals and by two-celled ovary immersed in the disk and bearing two or three divergent conical styles. They are shrubs or trees often decumbent or sarmentose,

commonly covered with hooked spines, the leaves are alternate, coriaceous, entire or crenate, three-to five-nerved, and mostly arranged in two ranks. The fruit is a globose or oblong drupe with a woody or bony stone, containing one to three seeds. **Z. jujuba** (syn. *Z. laccifera* ; Sans. kola ; Ben. kula, barai ; Fr. jujubier cotonneux ; Ger. stumpfblattriger Judendorn), a species found in Bengal, Cochin-China, East Indies and China. The fruits are edible, but not so sweet as *Z. vulgaris*. When ripe and dried, it is used as a mild laxative and expectorant. In China the bitter astringent bark, which yields a variety of kino, is used in apthae, diarrhoea and as a tonic. The juice of the root-bark is used as a purgative and externally in gout and rheumatism. **Z. oenopia** (Ger. sciefblattriger Judendorn), a species found in Ceylon and Java, where the bark is used as a febrifuge and digestive tonic. **Z. sororia** (Sans. karkandhu Ben. seya-kul), a species found in Bengal and East Indies, whose fruits are small and have an astringent sourish taste, but when ripe and dried are used as an expectorant, and the leaves as an alterative. **Z. vulgaris** (Sans. soubira ; Ben. kula ; Fr. jujubier cultive ; Ger. gemeiner Judendorn), probably a native of Syria, but cultivated in India for its esteemed edible fruit, and which when dried, mixed with honey is used as a demulcent and expectorant in pectoral complaints. **Z. zylupra**, a species found in Ceylon and East Indies with edible kernel.

Kh.

67. **Kharjjura** : **Phoenix**, a genus of palms, constituting the tribe—*Phoeniceæ*, comprising 12 species, all natives of tropical Africa and Asia, characterized by three distinct carpels, only one of which matures, containing a single erect cylindrical seed with deep longitudinal groove ; the trunk is destitute of spines, but is covered with persistent leaf-bases ; the palms grow in close clusters, forming groves ; the pinnate leaves are large and terminal, forming a spreading canopy, each consisting of very numerous, narrow, rigid and compressed leaflets, the lower ones shorter and transformed into spines. **P. dactylifera** (syn. *P. excelsa* ; Sans. pinda-kharjjura, sulemanî ; Ben. khejur ; Eng. date-palm ; Fr. palmier-dattier ; Ger. Dattelpalme ; Hind. cuhara), a native of northern Africa, Egypt, Syria and Arabia, but now cultivated in western India for its highly saccharine and nutritious fruits which are used as a food when ripe, either fresh or dried, and medicinally as a pectoral. The sap, tapped at the apex of the trunk, is drunk when fresh as refrigerant and diuretic, but when fermented, it becomes intoxicating liquor (*tari*) ; the fresh sap evaporated and thickened is made into syrup (Ben. gur). **P. silvestris** (Ben. khejur), a species found in eastern Bengal and East Indies, regarded by some as the wild form of *P. dactylifera* ; its sap yields sugar (Ben. gur) in abundance in the winter season. But its dates are small and somewhat less sweet and a trifle astringent.

G.

68. **Guggulu** : **Balsamodendron**, a genus of burseraceous trees of the tribe—Bursereæ, distinguished from the genus *Amrys*, by having!-diclinous flowers with an urceolate, persistent calyx, equal, linear-oblong petals inserted with the stamens upon a glandular disc, and a bilocular ovary with a very short style. **B. agallocha** (syn. *Amrys commiphora* ; Ben. guggul-gac), a species growing in Sylhet and the East Indies, which is a small tree, with a crooked trunk, drooping branches, small red flowers, and red berries. The tree is very aromatic, and gives a very agreeable perfume, when broken, and yields a gum-resin (Sans, guggulu ; Fr. Ger. bdellium, from ancient Gr. bdellion), which is chiefly used as an incense, but also as an expectorant. **B. berryi** (syn. *Amrys gileadensis* ; *Protium gileadensis*), a fragrant tree, growing in Malabar, possibly a variety of *B. myrrha*, yielding an aromatic gum-resin, which is included among *guggulus* which is classified into five kinds. **B. mukul**, a species growing in Scinde, considered by some a variety of *B. agallocha*, but its gum-resin is of darker color and of different odor. **B. myrrha**, a species growing in Africa and western India, and which yields myrrha. It is a small tree with scattered, pointed branches, scanty, alternate, trifoliate leaves, resembling *B. berryi*, but the flowers are disposed like those of Abyssinian *B. africanum*. The myrrh is secreted in the interior of the trunk, and by exfoliation of the outer layer of the latter, it is brought to the surface, where it exudes spontaneously (liquid

myrrh), or is set free by incisions. **B. pubescens**, a species found in Bengal and East Indies, whose bark yields a brittle, tasteless, and slightly odorous gum-resin (Bayee balsam). **B. zeylanicum**, a tree of doubtful botanical character, found in Ceylon, yielding a variety of elemi.

69. Gajara : *Daucus*, a genus of umbeliferous plants, roughly hispid, with finely divided leaves and small ovate or oblong fruit, covered with barbed prickles, comprising about 40 species, all natives of northern Asia, excepting one—*D. brachiatus*, which is indigenous to Australia. **B. carota** (Sans. gajara ; Eng. carrot ; Fr. carotte cultive ; Ger. gemeiner Mohre, Karotte), a biennial usually found in its wild state, growing in light sandy soil, with furrowed hairy stem, dividing into long, erect, flower-bearing branches, hairy leaves, with leaflets, divided into narrow, pointed segments, and small compound flowers in compound umbels. Its garden variety is now cultivated in every country, as a vegetable food. The root contains, which is the only edible portion, sugar starch, pectin, malic acid, lignin, albumin, extractive, salts and a volatile oil—carotin. The root is stimulant, and is also used externally as a vulnerary in indolent ulcers. The seeds are excitant and diuretic. *D. carota silvestris*, is the wild variety of the cultivated plant, and possesses the same properties, except the root is small and tough.

70. Guvaka : *Areca catechu* (Eng. betel-nut palm ; Fr. arec de l'Inde ; Ger. Betelnusspalme ; Ben. supāri-gac), a lofty and slender palmaceous tree, bearing pinnate leaves with the stalk rolled in the form of a cylinder, and unisexual flowers on a branched spadix enveloped in a double spathe, a native on the coastal regions of

the Bay of Bengal and East Indies, where it is cultivated extensively for the nuts. Besides the nut, in Malabar, intoxicating pastilles are made from the sap of the plant, and tender leaflets are eaten in the form of salad. The fine aroma of the flowers is also utilized to perfume various confections and drinks. The nut (Ben. supari; Eng. betel.nut; Fr. noix d'arec; Ger. Areknuss; Hind. guya), is enclosed in a thick fibrous rind. The nut contains in its nucleus hard albumin, 53 p. c. of fat, 30 p. c. of emulsin, together with sugar, catechu-tannic acid, catechin, gallic acid, alkaloids (arecoline, arecaine and guavacine) and a red coloring matter. The alkaloid arecaine slows the heart and respiration, and purges by increasing peristalsis; it is also a powerful tæniacide. The fluid extract of the areca nut can be used as a vermifuge with great success. Arecoline hydrobromide is an efficient miotic, and when applied in one-half per cent watery solution, it acts with a slight stinging sensation for a few moments, but leaves no conjunctival or ciliary congestion. Arecoline is the best sialagogue. The sliced nut is usually taken, and extensively used in India and the East Indies with the leaves of Piper bettle, and adding to it a little quicklime. It is astringent, masticatory, strengthens the gum and exercises the teeth, and is reputed to be tonic, digestive, antiperiodic and slightly aphrodisiac. But it colors the tongue, lips and the teeth scarlet, and unless care is taken to remove the stain, the teeth become black in course of time. However its wide popular use, perhaps, is an important factor, why dental caries is not so prevalent in India, as the teeth are kept in saline medium, and the acidifying bacteria can not propagate and can not act on the teeth.

71. Goksura : *Tribulus*, a genus of dicotyledonous choripetalic plants of the family—Zygophyllaceæ, comprising about fifteen species, natives of warm regions, characterized by abruptly pinnate leaves, a fruit from 5 to 12 indehiscent carpels and an embryo without albumin; they are herbs with loose prostrate branches, commonly silky and having oppos'æ stipulate leaves, one of each pair smaller than the other, or sometimes absent; the yellow or the white flowers are solitary in the axils of the stipules; the five-angled flattened fruit bears one or more spines or tubercles on each carpel. *T. lanuginosus* (Sans. goksura; Ben. gokhrī; Hind. gokhuru), a species found in tropical India and the East Indies, and its leaves and root are used as a diuretic, the seeds in gonorrhea and dropsy, and the herb as an astringent and anthelmintic. *T. terrestris* (Eng. land-caltrop; Fr. croix de chevalier; Ger. Erdstachelnuss), a species found in southern Europe, Asia Minor and northern Africa, and it was formerly used in Europe as an astringent tonic in dysentery and in hemorrhage.

72. Gairika : *Ferrum hæmatite* (Beng. geruya mati; Eng. red ochre; Fr. ocre rouge), a soft earthy hematite, consisting of the mixture of the hydrated sesquioxids of iron with various earthy materials, principally kaolin and quartz. It is used as an antidote to arsenic poisoning, and for dying the monk's robes. **Khatika :** *Creta* (Beng. khari; Eng. chalk; Fr. craie; Ger. Kreide; Hind. khariya), a white opaque solid substance, soft and readily friable,—a native carbonate of calcium containing slight traces of iron and aluminum and other impurities. Mixed with opium, it is used in diarrhoea with cinnamon in hyperacidity, and with flavoring matter as a dentifrice.

73. **Gojihva : Elephantopus scaber** (Beng. gojiyā ; Fr. pied d' elephant ; Mah. pathari), a herb found in Bengal and the East Indies, belonging to the genus—Asteraceæ, comprising about 16 species, all natives of the warm regions. The leaves boiled with rice, are used internally for swellings and gastric pains, and the decoction of the root and the leaves in dysuria.

Cha.

74. **Chandana : Santalum**, a genus of dicotyledonous, apetalous trees and shrubs, type of the family—Santalaceæ, tribe Osyrideæ, comprising 8 species, natives of from South India to Australia. They are smooth plants, bearing opposite or rarely alternate petioled coriaceous leaves which are feather-veined, but with the midrib alone conspicuous. The flowers are perfect, marked by parallel anther cells which open lengthwise by a sheathing disc produced into distinct fleshy scales, and by a bill-shaped or ovoid perianth, its tube adherent to the base of the ovary, the limb deeply divided into usually 4 valvate lobes, the stamens together with clusters of hairs, borne on their base. And the flowers are borne in the upper axils or short loose terminal panicles trichotomously branching and are followed by roundish drupes, crowned by a ring-like scar of the fallen perianth. **S. album** (Sans. sveta-chandana ; Beng. sādā-chandana ; Eng. white sandal-wood tree ; Fr. santal blanc ; Ger. weisser Santel-baum), is a native of Mysore,

yielding the valuable volatile oil (oleum santali) by distillation of the wood. The oil of sandal-wood is a pale yellowish liquid, of a strongly aromatic odor, a pungent spicy taste and slightly reaction, and contains two alcohols at boiling point, *a* and *b* Santalol, Santene, Santalone, and as ethers Teresantal and Santal acids. Sandal-wood oil acts as an internal antiseptic and as an astringent to the mucous surface, and is principally used in the treatment of gonorrhea, even in the acute state, given in capsules of 0.30 c. cm each, two or three times daily, and it generally relieves pain and discharge within four or five days. It is also valuable in pyelitis, cystitis, gleet, urethral hemorrhage and chronic bronchial catarrh. The oil is also extensively used in the manufacture of perfumes. The tree grows in the dryish localities in Southern India, ascending the mountains to the altitude of 3000 feet. The sap wood is white (sveta-chandana), and the heart-wood yellowish-brown (Sans. pitāva, hari-chandana), very hard and close-grained, more fragrant, scented with the oil, still more abundant at the root. The wood is much used as an incense, and ground up with water to a paste as a fragrant cooling application. It is also administered as a diaphoretic. The wood is also highly valued for carving, making ornamental boxes, which is protective from the insects, and at the same time sweet-smelling.

Rakta-chandana : Pterocarpus santalinus (Eng. red sandal-wood ; Fr. santal rouge ; Ger. dunkelrothe Flugelfrucht ; Hind. lāla chandana), a species indigenous to Southern India and the Phillippines. The heart-wood of red sandal-wood (*Santalum rubrum*), contains a red coloring matter of a resinous character—Santal in or

Santallic acid, Pterocarpin, tannin and other substances, which are used in pharmacy for coloring tinctures or liquors, but possesses no medicinal value. **Adenanthera pavonina** (Mal. mandsiadi), one of the largest and handsomest trees of Southern India, a native of Malabar and Ceylon, belonging to the leguminous family—Mimosaceæ, and yields hard solid timber (red sandal wood), which is used as a dye-stuff, and bright scarlet seeds which are used by the goldsmith as weights (4 grains each). The root is used as an emetic, and a decoction of the leaves for chronic rheumatism. The seeds (Fr. condoris, pois corail) which are red and lenticular are used for hydrophobia and epilepsy.

75. Varttulla : Pisum, a genus of leguminous plants of the tribe—Viciæ, distinguished from the large related genus *Lathyrus* by the dilated summit of the style which is inflexed and hardened, with reflexed margin above and bearded on the inner surface, comprising six species with numerous cultivated varieties, marked by their climbing habit and glaucous surface, pinnate leaves ending in a branching tendril, large stipules, large commonly papilionaceous flowers, followed by pendulous pods, containing nutritious seeds (peas). **P. arvense** (Sans. kalāya ; Ben. kalāya ; Eng. field pea ; Fr. pois de champs), a species indigenous to western Asia, but now extensively cultivated in India as a food-supply. **P. sativum** (Sans. varttula ; Ben. matara ; Eng. garden pea, Hind. matar) is cultivated in all warm regions for its sweet farinaceous edible seeds.

75 A. Chanaka : Cicer arietinum (Sans. Chanaka ; Ben. colā ; Eng. chick-pea ; Fr. pois chiche ; Ger. Zweigerbse ; Hind. chanā), a leguminous annual,

indigenous to Central Asia, belonging to the family—*Viciæ*, cultivated throughout India, characterized by round and hairy stalks, pinnate leaves, small white flowers and a five-lobed calyx bulging on the upper side, producing a short, hairy, puffy pod, containing one or generally two netted seeds, larger than pea, with two swellings on each side. The seeds are used as a nutritious food, either ground into meal or cooked whole. Roasted seeds are also favorite article of diet, and are regarded as an aphrodisiac and are used for dysuria and menstrual disorders. The plant contains much acid oxalate of potash, and is covered with glandular acid hairs. The pod exudes a viscid sour sap, containing much oxalic acid. A decoction of the seeds and leaves is used as diuretic, and the meal is used as an emollient cataplasm, and mixed with honey in carcinoma.

76. **Champaka** : *Michelia*, a genus of plants of the family—*Magnoliaceæ*, and the tribe *Magnolieæ*, characterized by introse anthers, by having the clusters of petals raised on a stalk, and by many-sided carpels. They are trees having much the appearance of magnolias, but with flowers usually smaller, and (with one exception) axillary, where magnolia flowers are terminal. *M. cathcartii*, a species allied to *M. champaca* found in Sikkim. *M. champaca* (Sans. champaka ; Ben. chāpā ; F. *Michelia champaca* ; Ger. wohlriechende Michelia ; Hind. champā), a species found all over India, and its bitter aromatic bark is used as a febrifuge, the bitter acid root-bark as an emmenagogue and externally in abscesses, the fragrant flowers beaten up with oil in foetid nasal catarrh, and the fruits are edible, and their seeds are used to destroy vermins. *M. excelsa*, a very

lofty and aromatic tree growing in the Himalayas, to the height of 40 feet, and possesses the same properties as *M. champaca*. *M. kisopa*, a tree growing in the Himalayas with a gray bark and the young parts clothed with appressed grayish pubescence but it has the same properties as *M. champaca*. *M. rheedii*, a variety of *M. champaca*, found in Southern India, where it is regarded as a distinct species, and its flowers boiled in oil are used in headache and in the affections of the eyes.

77. **Chitraka : Plumbago**, a genus of plants (leadworts), type of the family—Plumbaginaceæ, tribe Plumbagineæ, having a glandular calyx with five short erect teeth, a salver-shaped corolla with slender tube, free stamens and five styles united into one nearly to the top, comprising ten species, all natives of the warm regions, which are usually perennial herbs, with long branches or partly climbing, bearing alternate clasping leaves and spikes of blue flowers (or of other colors) at the end of the branches. *P. rosea* (Sans, usana ; Fr. dentelaire rose ; Ger. rosenrothe Bleiwurz), a rose-colored leadwort found in tropical India and the East Indies, where the root bruised and mixed with oil, is used as an embrocation, and internally in rheumatism, the bruised leaves in incipient abscesses, and the powdered root is introduced into the uterus to produce abortion. The plant contains an acro-narcotic poisonous principle. *P. zeylanica* (Sans. chitraka ; Ben. chitā ; Fr. dentelaire de Ceylan ; Ger. ceylonische Bleiwurz ; Hind. chitā), a species found in eastern India, Ceylon and East Indies, allied to *P. rosea*, but possessing milder properties. The root is sudorific, stomachic and vesicatory and is applied to incipient abscesses and buboes.

78. **Chiratā : Swertia**, a genus of dicotyledonous plants of the family—Gentianaceæ and tribe Gentianæ, characterized by wheel-shaped corolla with five or more nectaries and four or five dextrorsely twisted lobes, a very short style, and a two-valved capsule with its sutures not intruded, comprising about seventy widely scattered species, found in Europe, Asia, Africa and America. They are erect herbs with or without branches ; the annual species bear opposite, the perennial radical leaves ; and their flowers are blue or rarely yellow, borne in a crowded or loose panicle. **S. alata**, a species found in Nepal, devoid of therapeutic bitter principle—charatin. **S. angustifolia** (*Agathotes angustifolia*) a species found in the foot hills of the north-western Himalayas, furning a *chirata* inferior in bitter principles to *S. chirata*. **S. chirata** (*S. chirayata*, *Agathotes chirayata*, *Gentiana chirata* ; Sans. *kirāta-tikta* ; Ben. *chiratā* ; Eng. *chiretta* ; Hind. *chirāyatā*), a species growing in the Himalayas from 4000 to 8000 altitude. The entire plant with its stems and root either fresh or dried is used in medicine. It contains two amorphous principles, Ophelic acid and Chiratin, but no tannin. Its use, which is usually done in the form of tea, is followed by marked benefit in atonic dyspepsia and functional inactivity of the liver. It is a cholagogue and does not constipate, and it checks acidity of the stomach. With the seeds of *Cæsalpinia bonducella*, it is also used as a febrifuge. **S. elegans** (Tam. *silāras*) a species growing in southern India, whose bitter stems and roots are used as a tonic and febrifuge. **S. multiflora** a species found in Sylhet and the East Indies, where it is substituted for *S. chirata*, but it lacks its efficacy.

79. China : Panicum, a large and polymorphous genus of grasses of the family—Panicaceæ, characterized by having the pedicles jointed under each spikelet, and the branches of the panicle not continued beyond the spikelets ; the lower flower of the spikelet manifest but imperfect, either stimate or neutral, the upper flower closed and hard ; and the lowest of the commonly four glumes minute or awnless without bristles or appendages beneath. There are about 300 widely scattered species of this genus. **P. frumentaceum** (Sans. syāmā ; Hind. samā ; Mar. sāmvē ; Eng. Deccan grass), a bread-yielding species found in Southern Asia and Western India. **P. miliaceum** (syn. *P. milium*, Eng. millet ; Fr. millet rond ; Ger. achte Hirse ; Hind. chinā ; Mah. rālā ; Sans. chinā), a species cultivated in Africa, Western and Central India—an annual from two to four feet high with profuse foliage, the flowers abundant in open, much-branched, nodding, bristly panicles, producing a grain, which affords a valued carbo-hydrate food, and is used as a demulcent in diarrhoea and externally as poultice. There are also other millets as *Penicillaria spicata* and *Sorghum vulgare* ; *Sorghum vulgare* is identified by some botanist as the same with *Andropogon sorghum* or its variety. They also supply nutritious millets.

80. Chichinda : Trichosanthes, a genus of plants of the family Cucurbitaceæ and tribe Cucurbitæ, characterized by entire calyx-lobes, a five-parted wheel-shaped fringed corolla, conduplicate anther-cells and numerous polymorphous seeds, comprising about forty-two species, natives of tropical Asia, northern Australia and Polynesia. They are annual or perennial climbers, sometimes with a tuberous root, bearing entire or

lobed and cordate leaves and unbranched or forking tendrils ; the flowers are white and monoëcious the male racemed, the female solitary, and followed by a fleshy smooth or furrowed fruit, often large and globose, oblong or conical, sometime elongated, slender, striped and serpent-like. **T. anguina** (Sans, chichinda ; Ben. chichingā ; Eng. snake-gourd ; Fr. trichosanthes contourne ; Ger. schlangenfrüchtige Haarblume ; Hind, chachendā), a species native of southern Asia, especially cultivated in Bengal and southern China for its fruits, which are eaten cooked when green, but become purgative when ripe, and the seeds are used as tæniifuge. **T. cucumerina** (Fr. trichosanthes du Malabar ; Ger. gurkenartige Haarblume), a species found in Malabar, having a strong unpleasant odor. The stalk is used as an expectorant, the root as a purgative and tonic, an infusion of the tender shoots and dried capsules as aperient, the expressed juice of the leaves as an emetic, and the seeds as an anthelmintic and antiperiodic. **T. cuspidata**, a species found in Bengal and the East Indies, the root of which is a drastic purgative, the expressed juice emetic. **T. dioica** (Sans. patola ; Ben. patola ; Hind. parval), a species, indigenous to Bengal, and now cultivated in tropical India for its fruit, which is cooked and eaten as a vegetable ; and regarded as tonic and digestive. **T. incisa**, a species found in Bengal, whose root powdered and mixed with oil of *Azadirachta indica* (nimba) is used in ulcers. **T. laciniosa** (Sans. dindisa ; Beng. dherasa ; Fr. trichosanthes lacinië ; Ger. handtheilige Haarblume), a species found in Bengal and the East Indies, and whose fruits and tender shoots are used as stomachic

and laxative, *T. nervifolia*, a species found in Bengal and East Indies where the fruits are used externally in epilepsy and mental troubles. *T. palmata*, a species found in southern India, where the fruit, mixed with cocoanut oil is used in ear-ache ; the pulp is purgative, and the root is poisonous and is used in the pneumonia of the cattle.

81. *Chinchā* : *Rumex*, a genus of apetalous plants of the Family Polygonaceæ, type of the tribe Rumiceæ, characterized by six stamens, six or rarely four-parted perianth, with the outer segments unchanged in fruit, but the three inner ones erect and very much enlarged, often bearing a conspicuous grain or tubercle resulting from the thickening of the midrib. The included nut is sharply three-angled, but without wings. They are usually perennial deep-rooting herbs, comprising about hundred and thirty species, natives of temperate regions, but a few are found in the tropics. *R. acetosella* (Sans. chutrikā ; Ben. chukā-pālam ; Eng. field-sorrel ; Fr. oseille de brebis ; Ger. Feldsauramer ; Hind. chuk), a species indigenous to southern Europe, Asia and Northern India ; its leaves contain acid oxalate of potassium, and are used as an antiscorbutic, and the pressed juice is refrigerant. *R. scutatus* (Sans. changerī ; Ben. āmrula ; Fr. oseille rond ; Ger. schildblättriger Ampfer ; Hind. āmbavati), a species found in southern Europe, northern Africa and in the tropics, whose succulent acidulous leaves, which contain potassium binoxalate, are eaten fresh or its pressed juice is drunk as an antiscorbutic. *R. vesicarius* (Sans. chinchā ; Eng. bladder-dock ; Fr. patience vesiculeuse ; Ger. blasenfrüchtiger Ampfer ; Hind. chanchu), a species

found in southern Europe, central Asia, northern India and northern America. The pressed juice of its leaves is used as an antiscorbutic.

82. Chukra : Axetum (Sans. chukra ; Eng. vinegar ; Fr. vinaigre ; Ger. Weinessig), a liquid of pungent aromatic odor and sour taste, obtained from wine or other alcoholic solutions by acetous fermentation, containing about 6. p. c. of acetic acid, which is appetizing, digestive and beneficial in gastrorrhagia.

Ja.

83. Jatamāmsi : Nardostacys, a genus of aromatic herbs, belonging to the family—Valerianaceæ, comprising two species, natives of the Himalayas with thick fragrant root-stocks, producing long narrow leaves and dense clusters of purple flowers with four stamens. **N. grandiflora** (gross blumige Narde), a species found in Nepal and Kamaon, possessing the medicinal properties of the true Nard in less pronounced degree. **N. Jatamansi** (Sans., Ben., Hind. Jatāmāmsi ; Eng. spikenard ; Fr. nard indien ; Ger. achte Narde ; anc. Gr. nardos indike), a species indigenous to Nepal and Bhutan. Its bitter aromatic root is antispasmodic and slightly stimulates the circulation. It reduces irritability and reflex contractions, and is a sedative to the spinal cord. In small dose, it excites the sensation of warmth in the stomach, improves the appetite and digestion. It has proved its efficacy in the treatment of nervous

disorders in women, especially nervous headache, hysteria and hystero-epilepsy. Menopause disturbances are also improved by its use. A brown volatile oil contained in the rhizome, can be effectively used in epilepsy, hysteria and convulsion. It is also employed, mixed with sesame oil, and rubbed on the head as a nervous sedative.

84. **Jamvira : Citrus**, a genus of aurantiaceous trees of the family Rutaceæ with pinnate, but apparently simple coriaceous and punctate leaves upon usually winged petioles ; the flowers are white and fragrant, distinguished by cupular or urceolate calyx, about 20 versatile anthers, with filament polydelphous and dilated at the base ; and the fruit is pulpy with spongy rind, such as the lemon, lime, citron, orange, shaddock and other similar fruits. *C. acida* (Sans. bijoura ; Ben. tabālebu ; Hind. bijorā nibu), a species of sour lime, found throughout India, and which is regarded by some botanists as a variety of *C. medica*. *C. auranticum* (Sans. nāranga ; Eng. orange ; Fr. citronier oranger ; Ger. Pomeranzenbaum), a low-branching ever-green species, growing from 20 to 40 feet high, with greenish-brown bark, elliptical or ovate coriaceous leaves, petiole and fragrant flowers which yield neroli-oil. The tree is long lived, and it is indigenous to Cochin-China, Indian Archipelago and Southern China. It has three principal varieties, *C. bergamia*, *C. vulgaris* and *C. dulcis*. *C. dulcis* (Eng. sweet orange ; Fr. citronier a fruit doux ; Ger. Apfelsinenbaum ; Hind. nārang) is indigenous to southern China and northern India. From northern India, it has been introduced by the Arabs to the Mediterranean regions, and now it is cultivated in all sub-tropical

climates. The juice of the ripe fruit is refreshing, slightly aperient and is an antidote to intestinal putrefaction. The flowers in infusion, is a gentle nervous stimulant. The sub-variety cultivated in Sylhet produces a flattened orange (Ben. kamalā lebu ; Eng. mandarin orange) in which the rind separates very readily from the pulp, which is sweet and deliciously flavored. *C. bergamia* (Sans. nimbuka ; Ben. pāti-lebu ; Fr. bergamottier ; Ger. Bergamottenbaum), a species found in Bengal and East Indies, and it is regarded by some botanists as a variety of *C. limonum*. Its leaves are aromatic, and yield an oil, which is used to adulterate oil of bergamot. The fruits are globose and as large as an orange, the pulp white, containing a good deal of sour juice, which constitutes a portion of the commercial concentrated lime juice, and is used in making citric acid. *C. bigardia myrtifolia* (mandarin orange), a variety of *C. auranticum*, found indigenous to southern China and Assam. The fruit is smaller than the common orange, with a smooth, delicate rind, and a delicious pulp. A hydrocarbon is obtained from the rind of an agreeable odor and taste. The rind is regarded as a stomachic and digestive. *C. decumana* has two varieties, one identified with *C. histrix*, and the other with *C. pomellos* ; and it is regarded by some botanists as the parent of them both. *C. histrix* (Sans. danta-satha ; Eng. sour lime ; Fr. bergamottier de orfevres), a species regarded by some as the wild variety of shaddock (*C. decumana* ; Ben. jambura), the fruit of which is large, globose, with an astringent sour-bitterish taste, which the goldsmiths of Bengal use for cleansing ornaments. *C. limonum* (Sans. nimbu ; Ben. lebu ; Eng. lemon ; Fr. limonier ; Ger. Limonen-baum ; Hind. nibu),

a species indigenous to the mountains of north-western India. Arabs took it and introduced it in the Mediterranean regions, and now it is cultivated in all tropical and sub-tropical climates for its fruit, which is a berry of an ellipsoid form, knobbed at the apex, with a pale-yellow rind, whose outer layer is charged with a fragrant oil, and light-colored pulp full of acid well-flavored juice. The fruit though small than the citron, contains more citric acid mixed with phosphoric acids and potash salts, and for this reason, its fresh juice is used in scurvy. It has been also used in rheumatism and malarial fevers. The essential oil of lemon (*oleum limonis*) is made from the unripe rind, or its dried peel which is aromatic. The seeds are reputed to be vermifuge. *C. limetta* (Ben. kagaji lebu ; Eng. lime ; Fr. limettier ; Ger. Limitte ; Sans. nimbuka), a species by some regarded as a variety of *C. limonum*, and by others of *C. medica*, producing a small globose lemon with a thin rind containing very little of the bitter glucoside Hesperidin, and yields a very pleasantly flavored and acidulated juice. This fruit is much esteemed for making lemonade and for pickles. *C. lumia* (Sans. mista-nimbu ; Ben. mista-lebu ; Fr. lumie ; Ger. susse Citrone ; Eng. sweet lemon), a species found in Central India, the fruit of which is oblong with a shining yellow rind and curved navel, and the pulp very sweet. *C. medica* (Sans. jambira ; Ben. gora-lebu ; Eng. citron ; Fr. citronnier, cedratier ; Ger. Cedraten, citronenbaum), a species indigenous to northern India, resembling *C. aurantium*, but with leaves larger and indented at the edges, and standing upon the footstalks that have not the winged appendages characteristic of the other species ; and the flowers are slightly purpled on one

surface, and the fruit is very large. The species is divided into the following varieties, which are regarded by some botanists as distinct species : *cedra* ; *limonum* ; *lumia* ; *limetta*. This species was known to the ancient Greeks as *kitrer* and to the Romans as *citrea*. It is now cultivated in Sicily. The whole fruit is candied and is known commercially as *poncires*, and the peel as *citronat* or *succai*. **C. pompelmus** (Sans. *jambara* ; Ben. *jambura* ; Eng. shaddock), the most handsome tree of the genus, growing from 30 to 40 feet high, a native of eastern Bengal, Malayan and Polynesian Islands, now cultivated in many warm countries. The fruit is globose or pyriform and orange-like, but much larger, weighing sometimes 15 pounds, and of pale-yellow color with a thick smooth peel. The pulp is yellow, pale or crimson, and its juice is of pleasantly acidulated taste and is refreshing. The rind and the partitions are bitter, containing a glucoside hesperidin and a volatile oil. In Florida, a distinct variety has been developed (grape-fruit), which is distinguished by bearing its fruits in clusters, and which are of smaller size and the pulp finer. The fruit is regarded as a stomachic, appetizing and a mild laxative. **C. vulgaris** (Eng. bitter orange ; Fr. orange amere ; Ger. bittere orange), a species found in Assam, Cochin-China and southern China, and now cultivated in southern Europe and northern Africa. Its fruits are too bitter and too small to eat, but is distilled for essential oil (*essence de petit grain*). Its peel is tonic, carminative and stomachic. The flowers yield the *essence de neroli bigarade*. The leaves are used in nervous affections.

85. Jayapāla : Croton tiglium (Sans. *jayapāla* ; Eng. croton), a euphorbaceous plant, growing about 12 to 15

feet high, a native of tropical India and the East Indies. Its fruit, leaves, bark and the root all equally possess drastic purging qualities, but medicinally only its oil, pressed from its seeds, is used. The oil (*oleum crotonis*; Eng. croton oil; Fr. *huile de castiglion*; Ger. *Krotonöl*) is a pale-yellow or brownish-yellow, viscid and slightly fluorescent liquid, having somewhat fatty odor, a mild oily, afterward acrid, burning taste, containing Tiglic acid (methyl crotonic or crotonic acid) and also several glycerides of fatty acids. The topical application of croton oil to the skin causes irritation, inflammation, papular eruption which subsequently becomes pustular. Internally croton oil is used as a drastic purgative in cerebral affections, apoplexy in amasacra, and in cases where complete evacuation of the bowels is desired, as impaction of the faeces, lead-colic or paralysis of the intestine, to bring about prompt diminution of arterial pressure and derivative action. In comatose condition the dose may be simply dropped upon the tongue, and two or three times the usual dose is required which is 0.008 to 0.01 c. cm., a little diluted with sweet oil or butter.

86. **Japā : Hibiscus**, a large genus of dicotyledonous choripetalous plants of the family *malvaceæ*, type of the tribe *Hibisceæ*, characterized by having 5-cleft calyx. supplemented by 3 to 5 narrow bracts, by their long column of stamens, which are frequently anther-bearing for much of the length, and by 5-valved loculicidal pod with numerous seeds, comprising about 150 species, native of the tropical regions of both hemispheres. **H. cannabinus** (Sans. *sana*; Eng. brown-Indian or Deccanee hemp; Fr. *ketmie a feuilles de chanvre*; Ger. *hanfartige Ketmie*; Tam. *pālunگو*; Tel. *gonkurā*), a.

species cultivated in tropical India for its fibers, but its tender leaves are edible, and the seeds yield an oil, used for food and illumination. *H. rosa sinensis* (Sans. japā ; Ben. Hind. jabā ; Eng. China rose ; Fr. rose de Chine . Ger. rosenartige Ketmie ; Guj. jāsum ; Tel. mandārapu), a shrub indigenous to tropical India, Cochin-China and southern China with large handsome red or crimson flowers. The flowers are considered demulcent, refrigerant, emollient and aphrodisiac. The expressed juice of the petals can be substituted for litmus. In China a black dye is prepared from the flowers for the hair and the eye. In Cochin-China, the leaves are considered emollient and aperient, and its muciliginous infusion is used in small-pox ; the flowers are used in seminal weakness and cystitis ; and the root in coughs, and the pressed juice of the leaves in gonorrhea. *H. sabdariffa* (Ben. mesta ; Eng. roselle ; Fr. oseille rouge de Guinée ; Gr. rothe Sabdariffe ; Mal. polechī) a shrub found in most tropical climates, and it is extensively cultivated for its pleasant acidulous calyxes, containing tartaric acid, uncrystallizable sugar, mucilage, tannin, coloring matters and salts, are used for making tarts, jellies and for making cool refreshing drink. Its root is a mild purgative. It yields also a fiber, sparingly substituted for hemp. *H. tilaceus* (Ben. bolā ; Eng. cork-wood ; Fr. bois de flot ; Mol. pāruti), a species found in tropical India, East and West Indies, with very light floating wood, abounding mucilage, and the leaves are edible, while the root and the flowers are emollient.

87. *Jala-kumbhikā* : *Pistia stratiotes* (Ben. pānā ; Eng. tropical duck-weed ; Ger. schwimmende Muschelblume ; Hind. jala-kumbhī ; Sans. bāripamī), a stemless floating herb, common throughout the tropics, except

Australia and the Pacific Islands. It consists of a rosette of pale pea-green rounded and downy leaves. It floats unattached, its tufts of long feathery roots not reaching the depth of water more than a foot, but they increase by runners, often soon covering ponds and tanks, keeping the water cool, but affecting the drinking water. It belongs to the genus (*Pistia*) of monocotyledonous water-plants of the family *Araceæ*, constituting the subfamily *Pistioideæ*, characterized by the absence of the perianth, and the position of the solitary or few staminate flowers on the short free apex of a spadix which is adnate below to the small white spathe, and bears at the base a single obliquely globose one-celled ovary with thick style and cup-like stigma. This is the only species of the genus. Its leaves are demulcent and refrigerant, and the root emollient and laxative. The leaves are used also in dysuria and as an expectorant. *Blyxa octanda* (Sans. saibāla ; Ben. seolā; Hind. sivār) is an acaulescent aquatic plant of the family *Hydrocharidaceæ*. It is refrigerant, and is regarded as a nervous sedative.

88. *Jala-phala* : *Trapa*, a genus of floating aquatic herbs, constituting the family *Trapaceæ*. It is characterized by an ovary with two cells, each with an elongated ovule pendulous from the partion, and by the nut-like spinecent fruit. There are three species, natives of tropical and sub-tropical parts of Asia and Africa, extending to central Europe. They are water-plants with dimorphous leaves, one kind submerged, opposite, dissected and root-like, the other a rosette of toothed rhombic leaves, with inflated spongy petioles, floating on the parts in four. The species are known as the *water-caltrop* from the horns and spines of the singular fruit wich contains a single large

seed with a sweet and edible embryo which abounds in starch and is composed of two unequal cotyledons and a radicle which perforates the apex of the fruit in germinating. *T. bicornis* (Sans. trikona-phala; Ben. pāni-phala), a species cultivated in the ponds of Bengal and southern China for its starchy sweetish fruit, which resembles a bullock's head with two blunt horns, and which is eaten raw or cooked after being shelled, and is regarded as refrigerant, and given to quench thirst in fever. *T. bispinosa* (Sans. sringataka; Hind. singārā), a species growing in the waters of Cashmere, where the water-nuts form a staple farinaceous food. *T. natans* (Eng. water-chestnut, or Jesuit's nut of Venice; Fr. noix aquatique, corniole; Ger. gemeine Wassernuss), a native of central Africa to Germany and central Asia; its seeds are ground and made into bread in parts of south of Europe. This plant was formerly official in Europe. The fruit (nucis aquaticæ) was regarded as a refrigerant, the upper portion of the stem was used in poultices as a discutient, and the expressed juice in eye diseases.

89. **Jāti: Jasminum**, a genus of the family of Oleaceæ, containing about hundred and sixty species of shrubby, often climbing plants widely distributed in the warm regions of Asia, and extensively cultivated for the elegance and delicious fragrance of the flowers. The corolla of the flowers has a cylindrical tube which includes the two stamens, and a spreading limb with usually four or five divisions. The leaves are pinnately compound or reduced to a single leaflet. The white or the yellow flowers are axillary or terminal. *J. angustifolium* (Sans. mālati; Fr. jasmin a feuilles

etroites), a species of narrow-leaved Jasmine, whose bitter root, ground and combined with lime-juice and the root of *Acorus calamus* (Sans. *vacha*) is used in Bengal as a remedy for ringworm and herpes. *J. auriculatum* (Sans. *yuthikā*; Ben. *jui*) a small fragrant-flowered species, much cultivated and esteemed in Ajmeer and Bengal. *J. grandiflorum* (Sans. *jāti*; Ben. *chāmeli*; Hind. *jāi*; *chameli*), a species with large flowers, found throughout India which yields the commercial oil of jasmine. It is now cultivated in southern France and other warm regions. *J. officinale* (Sans., Ben. *mallikā*; Hind. *motiā*; Guj. *dojar*; Ma. *rām-magari*; Fr. *jasmin blanc*; Ger. *gebräuchlicher Jasmin*), a white-flowered jasmine, a native of India, and acclimatized in southern Europe, where its flowers (*flores jasmini*) was formerly used as a neurotic and emollient remedy. It is valued in India only for its flowers and the fragrant oil it yields, which is adulterated with the sesame oil and which is rubbed on the head as a nervous sedative. Its fruits are narcotic. *J. pubescens* (*J. pubigerum*), a downy jasmine, indigenous to Nepal, where its leaves boiled in oil are used in ophthalmia, and the root as an antidote to the venom of snakes. *J. revolution*, a species indigenous to Nepal, distinguished by yellow-petalled flowers which yield a delightful essential oil, used in perfumery, and the root is employed in ringworm. *J. sambac* (Sans. *vārsikī*; Ben. *bela-phula*; Hind. *bela*; Guj. *belya*; Mah. *mogari*; Fr. *jasmin d'arabie*; Ger. *arabischer jasmin*; Eng. *Arabian jasmine* or *zambak*), a white-flowered jasmine, indigenous to Arabia, but extensively cultivated in India, East Indies and southern China. In India the flowers are esteemed for their

fragrance and the essential oil it yields and which is used as a deodorant in foul-smelling ear and nose diseases. In the East Indies, the balsam prepared by boiling the leaves in oil, is used in anointing the eye in complaints of the eye, and the root and the flowers are regarded as lactifuge. In China the flowers are used for scenting tea. *J. undulatum* (Fr. *jasmin ondule*), a bitter-leaved species found in Malabar, regarded by some as a variety of *J. sambac*, and its flowers are esteemed for their elegance and their fragrance.

90. **Jāti-phala** *Myristica*, a genus of dicotyledonous apetalous trees, type of the family Myristicæ, and characterized by dioecious regular flowers with three-lobed calyx and united filaments, a single ovary cell and ovule, and alternate leaves. About eighty species are known, mainly natives of the eastern coast regions of India, and East Indies. They are aromatic trees, with small white or yellow flower, the leaves often pellucid-dotted and the edible fleshy fruit split in two or four parts, disclosing an arillode, usually crimsoned, which encloses the hard seed. *M. fragrans* (Sans. *jāti-phala*; Ben. *jāya-phala*; Fr. *muscadier musque*; Ger. *achter Muscatnussbaum*; Eng. *nutmeg-tree*), a species indigenous to Banda and a few neighbouring islands, and now cultivated in Penang, Singapur, Eastern Bengal, Brazil and West Indies. The fruit, a pendulous globose drupe about 2 inches in diameter, resembling a peach, has a fleshy edible exterior which splits when ripe into two halves, exposes a crimson fleshy foliaceous arillode which is dried and preserved as mace (Sans. *jāti-patri*; Beng. *jaitri*; Hind. *jāvitri*). Mace is extremely fragrant and aromatic. It is used with betel-nut and in cooking as a

condiment. The fibrous arillode (mace) envelops the bony seed, which when thoroughly dried, the shell is cracked and the olive-shaped kernel about an inch in length, usually treated with lime for preservation, becomes the nutmeg of commerce. It is principally used as an aromatic condiment. With aromatic, digestive, stimulating and carminative properties, nutmeg unites considerable narcotic power, and in overdoses produces stupor and delirium. It contains 3 p.c. volatile oil as that of the mace, composed of Pinenes, Dipentene, Myristicol, Myristicine, Myristic acid and Phenol, 34 p.c. of expressed oil, both of which combined, constitutes commercially oil of nutmeg. If it remains with the starch, albuminoids and resins, which the nutmeg contains, it is called the *butter of nutmeg*. *M. laurifolia*, a common wild nutmeg tree found in Madras, but its nutmeg as well as the mace lacks aroma, fragrance and the therapeutic value. *M. malabarica*, a species found in Malabar, about 40 to 50 feet high, producing a larger nutmeg than *M. fragrans*, but it lacks its aroma and taste. The concrete oil obtained by boiling the kernel is used as an embrocation in rheumatism and as an application to indolent ulcers. *M. tomentosa*, a wild species, found in the Andaman Islands, regarded by some as a variety of *M. malabarica*. The kernel is used in abdominal complaints, diarrhoea and is reputed to be aphrodisiac.

91. **Jiraka : Cuminum**, a genus of umbelliferous plants of the *Caucalineeæ*. *C. cuminum* (Sans. jiraka ; Ben. sukla-jirā ; Hind. jirā ; Eng. cumin. Fr. anis acre, cumin officinal ; Ger. venedischer Kummel), an annual fennel-like plant indigenous to the upper regions of the

Nile, now extensively cultivated in India for its seed which is agreeably aromatic, and possesses to a well-marked degree stimulative, digestive and carminative powers, containing a colorless oil—cuminol (cūmin aldehyde) of pleasant odor and pungent taste. It is chiefly used as a condiment. **C. nigrum** (syn. **Nigella sativa** ; Sans. krisna-jīra ; Ben. kāla jīra ; Hind. kāl-jirā ; Eng. black cumin ; Fr. cumin noir ; Ger. schwarzer Kummel ; an. Gr. melanthion), a species indigenous to upper Egypt and Syria, now extensively cultivated in India for its aromatic pungent seeds which are usually used as a condiment, and are stimulant, diaphoretic, carminative, emmenagogue and galactagogue, containing a volatile oil, fixed oil and melanthin (a glucoside). **Vernonia anthelminthica** (Sans. kālājāji ; Ben. kalouji ; Eng. khatzum oil-plant) a species indigenous to Malabar, yielding a viscid green oil which is diuretic, powerfully anthelminthic, and according to some, tonic and stomachic. The seed is also used in Malabar for flatulence and coughs, and in powder form, mixed with lime-juice, it is used to kill pediculi. The bitter leaves and the root are employed in external application in rheumatism.

92. **Jotismati : Cardiospermum halicacabum** (Ben. latā-phatkī ; Hind. mālakānguni ; Eng. heart-seed ; Fr. pois de-cœur ; Ger. gemeiner Herzsamen), a sapindaceous climbing herb, found in tropical India and Brazil, distinguished by having heart-shaped scars on the seeds, which are edible. Its mucilaginous root is reputed to be diuretic, diaphoretic and laxative, and especially used in the diseases of the bladder. The leaves are eaten as vegetable in Moluccas, and on the Malabar coast as a

remedy on the pulmonary diseases. The whole plant boiled with oil is used externally in rheumatism.

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93. **Tagara**: *Tabernæmontana*, a genus of dicotyledonous plants of the family Apocynaceæ and the tribe Plumeriæ, type of the subtribe Tabernæmontanæ, characterized by cymose flowers, a calyx furnished at the base of its five lobes with a continuous or interrupted ring of glands, and a fruit of two many-sided berries or fleshy follicles which are large and globose or smaller or oblique or recurved. There are about 50 species, mostly natives of tropical America, and only a few are indigenous to tropical Africa and India. They are trees or shrubs, commonly smooth, bearing opposite thin or coriaceous feather-veined leaves. The small cymes or yellowish salver-shaped flowers are terminal or variously placed, but not truly axillary. The smooth three-ribbed pulpy fruit contains several or many ovoid or oblong seeds with fleshy albumin. Many of the species secrete acrid, drastic and poisonous milky juice, except *T. utilis* of British Guiana whose stem yields a sweet, milky nourishing fluid, highly esteemed as food, though containing some caoutchouc. *T. coronaria* (Sans. tagara-pādukā; Ben. siuli-cop; Eng. East Indian rose-bay, wax-flower plant), a species found in Bengal and East Indies. The juice is used in ophthalmia and skin diseases, and the root-bark as an anthelmintic and in odontalgia. **T. crispa** (Sans. pindatagara) a species found in the

Madras coast and the East Indies, and the acrid juice of its root-bark is used in diarrhoea and as an application to abscesses. *T. dichotoma*, a tree found in Ceylon, and its fruit is poisonous.

94. **Tanduliya : *Amarantus***, a genus of apetalous annual herbaceous weedy plants of the family *Amaranthaceæ*, distinguished by the presence of variegated colored alternate leaves and bright-colored bracts of the densely clustered blooms of polygamous flowers, carrying two-celled anthers, an ovary containing one ovule and a solitary seed enveloped by a circumscissile utricule. *A. amardanha*, a species found throughout India, bearing edible fruits. *A. atropurpureus*, a herbaceous species found in Bengal containing 24.77 p.c. of potassium nitrate (saltpetre), and is used in asthma, epilepsy and angina pectoris. It has a depressing action upon the heart. *A. caudatus* (Eng. love-lies-bleeding ; Fr. amarante a queue ; Ger. Fuchsschwanz), a species found in Bengal, East Indies and Peru, having clusters of long red flowers which retain their color when dried. It has astringent and antihemorrhagic properties. *A. campestris*, a species growing in tropical India, and it is used as a demulcent and for the relief of strangury. *A. tenuifolius* (Sans. tanduliya ; Ben. kâtā-nate ; Hind. choulāikā), a species found in Bengal and East Indies, growing from 1 to 3 feet high, with long petiolate-ovate or lanceolate oblong dark-green flowers in panicles. The leaves are used to make poultices, and together with the root, are emollient and diuretic. *A. tricolor* (Sans. mārisa ; Ben. nate-sāka), a variety of the above, distinguished by its green, yellow, and bright-red leaves found in Bengal.

95. **Tālisa : Pinus**, a genus of coniferous trees of the tribe—Abiteæ, distinguished by the staminate flowers in numerous short catkins, and two forms of leaves, the primary small scale-like, the secondary long and conspicuous and in cluster from one to five each, enveloped at the base by a dry sheath. There are 75 species widely distributed throughout the northern temperate regions, with a very few extending within the tropics in Eastern Asia and Central America. They are tall overgreens bearing ovoid or oblong cones of closely imbricated woody scales with thin or thickened apex. Every scale bears 2 winged seeds, the embryo from 3 to 10 seed-leaves set in a circle. **P. deodara** (syn. *Cedrus deodara* ; Sans. deva-dāru ; Ben., Hin. deva-dāru), a lofty and a large tree growing throughout India, and which yields a coarse turpentine, which is used as a diaphoretic, in pulmonary troubles, and externally for ulcers and cutaneous lesions. **P. longifolia** (Sans. sarala ; Fr. pin a longues feuilles ; Eng. cheer pine) a long-leaved species, indigenous to the Himalayans, yielding tar and turpentine. **P. webbiana** (Sans. tālisa) a native of Nepal which yields a fragrant turpentine, and which is used in bronchitis and dysentery.

96. **Tāmra : copper** (Fr. cuivre ; Ger. Kupfer ; L. cuprum) is inert and insoluble, and only **Copper sulphate** (Sans. tuttha ; Ben. tute ; Hind. nilā-tutiā ; Fr. sulphate de cuivre ; Ger. schwefelsaures Kupfer ; L. cupri sulphus ; Eng. blue vitriol) is used medicinally. It is a substance of azure-blue triclinic crystals of a disagreeable metallic taste, moderately soluble in water, but insoluble in alcohol. It is irritant, poisonous and somewhat escharotic, and in dilute solution, stimulant and astringent. It is used

internally in chronic dysentery and diarrhoea for its influence upon the gastro-intestinal mucous membrane, and is also given as an emetic in narcotic poisoning in a very minute dose. Externally it is applied in solid stick, as a superficial caustic in indolent ulcers, syphilitic and other sores in the mouth and throat, to promote cicatrization.

97. **Tāla-mūli** : *Asparagus ascendens* (Sans. musali ; Ben. tālamuli ; Hind. kāli, saphed-musali ; Fr. asperge ; Ger. spargel), a perennial liliaceous herbaceous species found throughout India, belonging to the family—Convallariaceæ, tribe Asphodeleæ, distinguished by very narrow leaves, 6-parted perianth, 6 perigynous straight stamens, a very short style, three stigmas, and the fruit is a berry containing 3 cells, each cell containing 2 seeds. It has a much branched stem rising from the thick and matted root-stock and small greenish yellow flowers. The narrow thread-like so called leaves are in reality branchlets growing in clusters in the axils of the tree but scale-like leaves. The rhizome has a bitterish mucilaginous taste and is reputed to be aperient, diuretic, emmenagogue and aphrodisiac, but not very efficacious. The edible part is the turion or young shoot covered with scales in place of leaves. It is much esteemed in Europe as an aperient and aphrodisiac vegetable food. It contains asparagine.

98. **Tāla** : *Borassus flabelliformis* (Sans. tāla, trna-rāja ; Ben. tāla ; Eng. palmyra palm ; Fr. rondier en eventail, cocotier de mer ; Ger. gemeine Fächerpalme ; Tam. panam), a species found in the coastal regions of tropical Africa and India. It is a graceful and lofty plant, growing to a height of 80 or sometimes 100 feet, its cylindrical trunk bearing a round head of leaves which

are 8 or 10 feet long, with a blade of circular outline, plaited and palmately incised. The fresh juice of the young flower-spike is used as a cooling and resolvent drink ; it is also given in phthisis ; fermented it becomes the palm-wine or toddy (Hind. *tārī*), the cheap intoxicating beverage of the lower classes, and distilled it becomes *arrack* ; treated like the juice of the sugar-cane, it yields palm-sugar (jaggery). The fruit is edible. By squeezing the thick fibrous body that surrounds the bony seeds, a thick yellowish and sweet jelly is obtained which is eaten raw or cooked in various ways. The porous, fatty bulb of the germinating seed is eaten as a fresh fruit and which is obtained by cutting the hard shell. It has a pleasant, sweet, and oily refreshing taste. The leaves are used for writing sacred books with a style. The children also use them for learning how to write. The wood of the well-matured trees is extremely hard and strong, and is used in various ways.

99. **Tinduka : Diospyros**, a large genus of trees and shrubs of the family Diospyraceæ, comprising about 150 species, natives of the warm regions, especially of Asia, excepting 2 species in America. The fruits of most of the species are exceedingly astringent, especially when immature and unripe, owing to the large amount of the tannic acid they contain. The wood is hard and heavy and is much esteemed for curving. Ebony is the heart-wood of several species ; the best and the most costly with the blackest and finest grain is obtained from *D. ebenum* of Ceylon. *D. chloroxylon* (Fr. *plaque-minier a bois jaune*), a species found on the Coromandel coast, and whose fruit is edible when ripe. *D. glutinosa* (Sans. *tinduka* ; Ben. *gāba* ; Hind. *tendu* ; Fr. *plaque-*

minier visqueux), a species found in Bengal and the East Indies. The ripe fruit is edible, is astringent and is given in diarrhea. The immature fruit yields a glue by incision ; its juice is used for tanning. *D. melanoxylon* (Sans. tumvuru ; Fr. plaqueminier a bois noir ; Ger. Schwarzholzbaum), a species found on the Coromandel coast, where the astringent bark is applied to ulcerations, and mixed with black-pepper, is used in dysentery. The tree supplies a fine ebony wood. *D. malabarica*, a species found in Malabar, where its young leaves and fruits are used in apthæ and ophthalmia, the bark in fever and gastralgia, and the seeds yield an oil which is employed as a mild purgative. *D. tomentosa*, a Bengal species which supplies a valuable ebony wood.

100. *Tila* : *Sesamum*, a genus of sympetalous herbs type of the tribe *Sesameæ* in the family *Pedaliaceæ*, comprising 14 species, natives of tropical Africa and Asia, characterized by flowers with a corolla-tube curved down and dilated above a short oblique base, terminating in a somewhat two-lipped limb ; with a regular ovary which becomes a usually four-angled oblong capsule, partially loculicidal, and at the apex unarmed, compressed and obtuse or shortly acuminate. They are erect or prostrate herbs with tough and gummy surface, bearing opposite leaves below, alternate above, and either entire or cleft. The pale or violet flowers are solitary in the axils. *S. indicum*, (Sans. krsna-tila ; Ben. kāla-tila ; Hind. kālo-tila ; Fr. sesame ; Ger. Sesom ; anc. Gr. sesamon), an annual herbaceous species, indigenous to India, now cultivated extensively in all tropical and subtropical climates, for the seeds, which when pressed yield a yellowish fixed oil, bland, inodorous or nearly so, rich in olein, neutral in

reaction, and of slight nut-like taste. It resembles olive oil and is slightly laxative. The seeds are also used as food, having high per centage of fat, carbohydrates, sugars, and proteids. The leaves are used as a demulcent and for emollient cataplasms, and when macerated, the leaves yield a mucilaginous remedy, useful in cholera infantum and dysentery. *S. orientale* (sukla-tila ; Fr. *digitale orientale*), a species found and extensively cultivated in India, and regarded by some a variety of *S. indicum*.

101. *Trāyamānā* : *Thalictrum foliolosum* (Sans. Ben. *trāyamanā* ; Hind. mar. *trāyamān*) a species of ranunculaceous herb, indigenous to tropical India, the root of which is tonic and aperient, and is used in atonic dyspepsia.

102. *Tulasi* : *Ocimum*, a genus of the labiate herbs and shrubs, type of the tribe Ocimeæ, distinguished by short corolla-tube and the diflexed fruiting calyx with the ovate posterior tooth largest and decurrent. There are about 50 or 60 species distributed over warmer regions, especially tropical India, Africa and Brazil. They bear simple or branched terminal racems of small flowers, usually whitish and six in a whorl with projecting pistil and stamens. *O. album* (Sans. *sukla-tulasi* ; Tam. *kunja-karai*), a species indigenous to southern India, where the juice of the leaves is used in catarrh and bronchitis. *O. basilicum* (Sans. *surasa* ; Eng. sweet basil ; Fr. *basilic cultive* ; Ger. *Basilienkraut*), a species indigenous to India, having several varieties—*bullatum* ; *fimbriatum* and *lignosum*. The leaves and the leafy tops which have a pungent taste and clove-like odor are used in bronchitis, and when dried as a seasoning. The juice of

the plant is anthilminthic, and is used in otalgia. A volatile oil is distilled from the plant, which if kept, crystallizes into camphor isomeric with turpentine camphor. The seeds are used in catarrh, chronic diarrhoea, dysentery, gonorrhoea and nephritis, and also to relieve the after-pains of parturition. *O. canum* (grāmyā), a species closely related to *O. basilicum*, the aromatic leaves of which have a pleasant taste and are used in catarrh. *O. frutescens* (Syn. *O. gratissimum*; Fr. basilic de Ceylon), an odoriferous species indigenous to Ceylon, South Sea Islands and Brazil. The aromatic roots are used like balm, and the demulcent infusion of the seed is employed in gonorrhoea. *O. hirsutum* (Sans. barvvari, Fr. basilic velu), a species found in Bengal and the East Indies, where the juice of the tender leaves is used in cholera infantum. *O. minimum* (Sans. maruvaka; Ben. ksudra-tulasi; Eng. bush-basil; Fr. petite-basilic), a species found all over India, and its leaves are used for seasoning. *O. pilosum* (Sans. khara-puspa; Fr. basilic couvert de poils), a species with hairy coating found throughout India, where its mucilaginous seed is used to relieve the pains of parturition. *O. sanctum* (sulavā; Ben. krsna-tulasi; Eng. holy basil; Fr. basilic saint), a species indigenous to India and tropical Australia. The plant is sacred to Visnu and the leaves are used in his worship, and the votaries make rosaries out of its wood. The root is febrifuge, and the dried leaves are used as snuff in myiasis. Mixed with lime-juice, the leaves are used in ringworm. The plant in decoction is used in diarrhoea. The seeds are mucilaginous and demulcent. *O. tenuiflorum* (Fr. basilic a fleur tendres), an aromatic and stimulant species growing in Ceylon and Java.

O. villosum (Ben. *gandha-tulasi*), a species found in Bengal and East Indies. Its aromatic leaves are used as a condiment ; their juice, mixed with black pepper and ginger is used in the cold stage of the intermittent fever ; and a diaphoretic and demulcent jelly is prepared from the seeds.

103. **Tuvara : Hydnocarpus**, a genus of plants of the family Flacourtiaceæ, and tribe Pangieæ. They are trees with alternate, pinnately veined, short-stalked, toothed or entire leaves, dioecious flowers in small axillary racems, and berry-like capsules with woody walls. There are about 25 species natives from eastern India to Sumatra and Java. **H. anthelminthicus**, a tree growing in Cochin-China and Siam, where the tree is known as *Maikrabo tree* and by the Chinese *ta-fung-tsze*. the oil expressed from the kernel of the fruit, is used in various cutaneous diseases. **H. inebrians**, a species found in Malabar and Ceylon where it is known as *Makulu*. The fruit is extremely poisonous, but the oil expressed from the seed is used in leprosy and various cutaneous diseases. **H. kurzii** (Syn. **Taraktogenos kurzii** ; Sans. *tuvara* ; Ben. Hind. *chāl-mugrā* ; Eng. *chaulmugra*), a species found in northern Burma and Arakanas. It is a tall tree, similar to the other species of the genus, in shape and size of the plant, leaves and the almond-shaped fruit, but only lacking the double tæsta which are found in the fruits of *H. odoratus*, *H. castanes*, *H. anthelminthica*. The oil expressed from the seed is a yellowish acid viscid oily liquid of repulsive odor and taste, and containing, chaulmugric and hydnocarpic acids. It has been found very efficacious in the treatment of leprosy. The best results are obtained by intramuscular injections of the ethyl esters or intravenous

injections of the salts-chaumoogric and hydnocarpic acid. It results in the destruction of the lepra bacili and the leprous nodules. *H. odorata* (Syn. *Gynocardia odorata*), a tree found in Assam, Arakanas Burma often together with *H. kürzii*, from which it is hard to distinguish. But the oil of its fruit, though it is often mistaken for the *Chaulmugra*, has not the same therapeutic efficacy. *H. Wightianus*, a species found in tropical India, where an infusion of its seeds is used as a detergent douche after delivery, and the oil obtained from the seeds is used in skin diseases.

104 *Tejavati*: *Xanthoxylon*, a genus of the plants of the family Rutaceæ, type of the tribe Xanthoxyleæ, characterized by alternate pinnate leaves, by polygamous flowers with from 3 to 5 imbricate or induplicate petals and 3 to 5 stamens, and by a fruit of 1 to 5 somewhat globose and commonly 2-valved carpels. There are about 15 species, natives of temperate eastern Asia and North America. They are trees or shrubs, sometimes armed with straight or recurved prickles. The leaves are commonly odd-pinnate, rarely reduced to 1 to 3 leaflets; the leaflets are entire, crenate, oblique and pellucid-dotted. The flowers are small, usually white or greenish, commonly in crowded axillary and terminal panicles. The fruit is usually aromatic and pungent with a glandular-dotted pericarp. The bark, especially that of the roots, is powerfully stimulant and tonic, and often used for rheumatism, to excite salivation and as a cure for tooth-ache. It contains a bitter principle-*berberine* and a yellow coloring matter. *X. budrunga*, a tree indigenous to Assam. Its fruit which has the odor of lemon-peel, and contains in its outer coat a fragrant balsam, and in the spicy seeds an

aromatic oil, is used as a tonic. The aromatic root is sudorific, emmenagogue and febrifuge. *X. rhetsa* (Sans. tejavati ; Hind. tejavaala ; Ger. sichelblattriges Gelbholz), a prickly tree found in Bengal and the East Indies, whose aromatic bark, the unripe capsules which taste like fresh orange peel, and the pungent seeds are used as spices and medicinally as stimulant tonics. *X. triphyllum*, a-resin yielding tree of the Western Ghats, whose capsules have the aromatic properties of those of *X. rhetsa*.

Da.

105. *Dārīma : Punica granatum* (Sans. dārīma ; Ben. bedānā ; Hind. ānār ; Eng. pomegranate ; Fr. grenadier cultive ; Ger. granatbaum), a deciduous ornamental tree, constituting the family Punicaceæ, formerly classified in Myrtaceæ, a native of Western Asia to north-western India, growing 15 or 20 feet high, with numerous slender branches, some of them armed with thorns, the leaves lance-shaped or oblong, flowers scarlet, large, and sometimes doubled. The fruit has six rounded angles, and bears at the summit the remains of the calyxlobes. It has a hard rind with numerous seeds, each enclosed in a layer of pulp of reddish color and pleasant subacid taste. The pulp is edible, and its juice is esteemed as a refrigerant and aperient drink and which is given in fevers. The rind contains a large amount of tannin, and is used as an astringent medicine and in tanning. The flowers afford a red dye. The bark

supplies the color of the yellow morocco leather, and that of the root an efficient tanniacide, this property residing in an alkaloid-*Pelletierine* contained in it. **Balaustum pulcherrimum** (Ben. dālim ; Fr. balaustier, miogranier), a shrub belonging to the myrtaceous family, looking like a dwarf pomegranate tree, found in South-Western Australia and Bengal, bearing flowers and fruits like the pomegranate in color and shape, but smaller in size, the fruit succulent within, less sweet and more astringent and many-seeded, with a soft semi-attached rind, and tipped with the persistent lobes of the calyx.

106. **Dāru-haridrā** : *Berberis*, a genus of berberidaceous shrubs with yellowish wood, and with the primary leaves often transformed into spines ; bearing in their axils a fascicle of secondary leaves. The calyx consists of from 6 to 9 deciduous sepals arranged in two or three rows ; the corolla of 6 unguiculate petals placed opposite the sepals and each provided at its base internally with two glands ; there are 6 stamens and styled stigma. The fruit is a berry of two or more seeds, umbilicate or perforate above. **B. aristata** (Hind. dāru-haldi), a species growing in Northern India, distinguished by its slender pendulous or erect racemes of flowers, longer than the leaves and not corymbose. The bark of the root contains much berberine, an alkaloid of yellow color and with bitterish taste, and which is used as a tonic ; its decoction is also employed in ophthalmia. **B. asiatica** (Ben. dāruā haldi), a species found in the the eastern Himalayan foot-hills and north-eastern Bengal, containing much berberine, and is used as a tonic. **B. chinensis**, a species found in China and north-eastern India. The fruit a dark purple berry, is

used by the Chinese in preparing a cooling and tonic drink ; the juice of the fresh fruit is applied to tired and fatigued eyes, and an infusion of the leaves in nervous headache and fatigue. *B. lycium*, a species found in the Gangetic valley, containing much berberine in the wood and the root-bark, whose decoction is employed as a local remedy in ophthalmic affections.

107. *Drākṣa Vitis*, a genus of plants, including the grape, type of the family Vitaceæ, comprising about 40 species, mostly natives of the temperate regions, characterized by polygamodioecious flowers, each with a cap of 5 coherent caducous petals. *V. latifolia*, a species found in Assam, where the juice expressed from the tender leaves is used in odontalgia, as a detergent in indolent ulcers, and internally as an alterative. *V. setosa*, a very acrid species found in Assam, the leaves of which toasted and smeared with oil, are used as a maturant. *V. trifolia*, a species found in Assam, the leaves of which are used as febrifuge and the roots as a discutient. *V. vinifera* (Sans. drākṣā ; Eng. grape-vine ; vigne cultive ; Ger. edle Weinrebe), a native probably of the Caspian region, but now cultivated extensively in more than 1500 varieties in all temperate regions, and many of them have been introduced in Cashmere. The leaves and tendrils contain tartaric and malic acids, tartrates and malates ; glucose and cane-sugar. The juice expressed from them is cooling, astringent, and has been used in diarrhea and hemorrhages. The unripe fruits contain malic, tartaric and racemic acids, and in their skin tannic acid, and its refrigerant juice was formerly used in Europe in epilepsy. The ripe fruits (Hind. āngura).

are diuretic, laxative and refrigerant, and its fermented juice is known as the wine. The dried fruits (Hind. kismis ; Eng. raisins ; Fr. raisins secs. Ger. Rosinen ; L. uva passa) are mildly laxative. The seeds contain 5 or 6 p. c. of a bland fixed oil, consisting of the glycerides of erucic, stearic and palmitic acids, and given either as a powder from or in the form of oil, they have proved efficacious in chronic diarrhea, in many cases.

108. **Dugdhiḱā :** *Euphorbia*, the typical genus of the family-Euphorbiaceæ, characterized by having its achlamydeous, unisexual flowers within a cup-shaped, calyx-like involucre, the central solitary pistillate flower being surrounded by numerous monandrous staminate ones and the whole resembling a perfect flower. There are over 600 species, known generally as *spurges* found in all temperate regions, and more sparingly within the tropics. They vary greatly in habit, especially the tropical species which are sometimes shrubs and trees ; and many African and East Indian species have succulent, leafless, spiny and angled stems, resembling columnar cactaceæ. They abound in an acrid milky juice, which possesses active medicinal and sometimes poisonous principles. *E. antiquorum* (Fa. euphorbe des ancien ; Ger. Wolfsmilk der Alten ; Malay. schadida-calli ; Eng. triangular spurge), a species found in Egypt Arabia, Bengal and East Indies, the milky and resinous exudation of which in the form of tears or oblong masses, about the size of a pea, with small holes produced by the prickles of the plant, light-yellowish color, acrid taste and slight odor, was known and used therapeutically by the ancient Greeks as *euphorbium*. *Euphorbium*

contains resin, wax, calcium malate, lignin, bassorin, and volatile oil. It is violently emetic and cathartic ; largely diluted with wheat-flour or starch, it is employed as an errhine in amaurosis, deafness and other obstinate affections of the head. In Bengal, the corrosive juice that flows from branches, is used externally in rheumatism, and as a vesicant in veterinary practice. *E. cattimandoo* (Tel. cāttimāndu ; Eng. Madras caoutchouc plant), a species found the Coromandel coast which exudes an adhesive substance, and which is used externally in rheumatism ; the fresh juice of the plant as a vesicant. *E. ligularia*, a species found in Bengal, where it is held sacred to the snake-goddess Manasā. The root mixed with black pepper is used both internally and externally in snake-bites, and the milky juice is employed as a caustic application to warts and skin eruptions, and internally as a drastic purgative. *E. nivala*, a species closely allied to *E. ligularia*, found in Bengal And the East Indies, where the juice of the leaves is used as a purgative, rubbed over the eyes to remove dimness of vision, and warmed given in earache ; mixed with margosa-oil, as an external application in rheumatism. The pulp of the stem, mixed with fresh ginger is used to prevent hydrophobia, *E. thymifolia* (Ben. seut-kheruā ; Tam. chin-amaum-pachāyarise sittra paladi ; Tel. biddari-nanabiām ; Fr. euphorbe a feuilles de thym), a species found in tropical India, distinguished by thyme-like leaves, and whose slightly aromatic and astringent seeds and leaves are used as vermifuge. *E. tirucalli* (Ben. lunkā-sij ; Tam. tirucālli ; Eng. milk-hedge ; Fr. euphorbe tirucalli ; Sans. dugdhikā), a species found in tropical India, where the fresh acrid milky juice is employed as a

vesicatory, and the root in decoction internally in gastralgia. On the Malabar coast, the milky juice is given, mixed with butter as a purgative. *E. trigona*, a species very similar to *E. antiquorum*, indigenous to Bengal and the East Indies, and which supplies euphorbium.

109. *Durvā* : *Cynodon*, a genus of grasses, low creeping perennials with digitate one-sided spikes, belonging to the tribe Chloridæ. *C. dactylon* (*Dactylon officinale* ; Sans. ganda-dūrvā ; Fr. chiendent ; Ger. wuchernder Hundzahn), a species of wide distribution, and whose macerated leaves are used as a hemostatic, and the expressed juice as a diuretic. *C. linearis* (Sans. nīla-dūrvā), a species found in Bengal, whose root-stock is used like the leaves of *C. dactylon*.

110 *Dronā* : *Leucas*, a genus of the *Betoniceæ*, *L. aspera*, a species found in Bengal and the East Indies where the leaves are eaten as vegetables. *L. cephalotes* (Sans. dronapuspā ; Ben. daruna-phula ; Hund. gumā), a species found in tropical India, where it is used in snake-bites. *L. linifolia*, an erect, somewhat pubescent or tomentose species found in Bengal and Madagascar where the bruised leaves are used in snake-bites, and snuffed up the nostrils in headache. *L. zeylanica*, a species found in Ceylon, where its bitter root, and the bitter and pungent leaves are used in skin diseases, especially scabies.

Dha.

111. Dhātaki : *Grislea tomentosa* (Ben. dhāi-phul ; Hind. dhāvaī), a shrub or a small tree, found throughout tropical India, and whose petals furnish a red dye, and the leaves are used in Madras for dying leather, and the infusion of leaves is used as tea. In northern India the dried flowers are used internally as an astringent and stimulant, and externally in powder form, as an application to foul ulcers.

112. Datura : *Datura*, a genus of solaneous herbs with angular toothed leaves, large funnel-shaped, bluish-white or purple solitary axillary flowers, a large, tubular ventricose 5 angled calyx with a persistent orbicular base, 5 stamens and 2 celled capsule with 4 valves, and prickly, globular 4 valved pods. There are about 15 species, all of them possessing disagreeable odor and a poisonous alkaloid *Daturine*, resembling the action of Belladonna. ***D. fastuosa*** (Sans. Kanaka-dattūrā; Ben. Kanaka-dūtra; Hind. daturā; Fr. datura fatesux), a species found all over India, and its leaves are used locally in poultice or fomentation as an anodyne for engorged breast-tumors, rheumatic pains, or its fumigation in asthma and spasmodic coughs. Seeds are soporific and are applied to boils and carbuncles to relieve pain. ***D. metel*** (Syn. *D. alba*, *D. meteloides*; Ben. sveta-dūtrā; Fr. metel; Ger. weichhaariger Stechapfel), a species indigenous to Rajputana, but found all over India, containing less alkaloid than *D. fastuosa*. ***D. nilhummatu*** (Ben. krsna-dūtrā), an undershrub growing in the sands of

Malabar, where the leaves are used externally in rheumatic pains, and the seeds and leaves are smoked like tobacco in asthma, spasmodic cough and as an aphrodiac.

113. Dhyānaka : Coriander sativum (Ben. dhanē ; Hind. dhania ; Fr. Coriander cultive ; Ger. gemeiner coriander), an umbelliferous annual slender herb a native of the Mediterranean region, now extensively cultivated in tropical and subtropical climates for its fruit which is globose, nearly smooth, pleasantly aromatic, and is used as a condiment. It is stimulant and carminative. The aromatic flavor is due to the volatile contained in the oil coriander.

Na.

114. Nala : Lobelia nicotianæfolia (Hind. narasala), a species found in Vindya Hills and in Ceylon, belonging to the family Goodeniaceæ, comprising about two hundred and twenty-five species widely scattered in warm regions, distinguished. This is a herb with alternate leaves, irregular five parted axillary flowers, and contains two alkaloids (lobeline and crytalline solid). Its roots, capsules and leaves are used as antispasmodic, especially in asthma and spasmodic cough.

115. Nārīkela : Cocos nucifera (Ben. nārikela ; Hind. nāriyala ; Eng. cocoanut ; Fr. cocotier ; Ger. ächte Kokospalme), a species supposed to be indigenous to southern Asia, but now extensively cultivated in the tropical regions of both hemispheres and the Pacific

Islands, thriving best near the sea. It has a cylindrical stem, rising to a height of sixty to ninety feet, and surrounded by a crown of feather-like leaves from eighteen to twenty feet long. The small white flowers grow on a branching spadix, inclosed in a hard tough spathe. The fruits (cocoanuts) are in bunches of five to fifteen, of subtriangular ovoid form about twelve inches long and six inches broad. They have each a single seed inclosed in a very hard shell, surrounded by a thick fibrous husk. The fibre is made into matting, cordage etc. The flesh or the meat of the nut is a white, pleasant-tasting nutritious mass, soft, and gelatinous when young, but becoming tougher and oily with maturity. This is used as food. The nut also contains when young one to two pints of pleasant, refreshing sweetish liquid, which is used as drink. The oil is used in cookery and medicinally it has been found useful in pulmonary diseases, its virtues being similar to those of cod-liver oil, while it has the advantage of being more palatable, and not producing nausea. It is also used in making soap, but as it contains free caprylic acids, it is rather unfit for toilet soaps, leaving a rancid odor on the skin.

116. **Nimba** : **Melia**, a genus of dicotyledonous choripetalous plants of the family-meliaceæ and the tribe Meliæ, characterized by pinnate leaves, an elongated stamen-tube and from ten to twelve anthers. They are trees with alternate pinnate or bipinnate leaves and largely panicles of medium-sized flowers which are white or purple and either five or six parted. There are twelve species found in eastern India, Australia and Oceania. **M. azadirachta** (syn. **Azadirachta indica** ; Sans. nimba ; Ben. nima ; Hind. nīm ; Mah. limba ; Eng. nim-tree or

margosa ; Fr. *margousier* ; Ger. *indischer Zedrach*), a tree from twenty to thirty feet high indigenous to tropical India with oblique leaflets, small white flowers disposed in panicles, three-lobed stigma and trilocular ovary containing colateral ovules, and one-celled fruit containing a single exalbuminous seed. Its bark (*cortex azadirachta*) contains a bitter principle-Margosin, or according to some an alkaloid-Azadirine, which is tonic, anthelmintic, and the root-bark *ferbifuge*. The leaves are used as application in rheumatism, glandular swellings and skin-diseases. The fruit furnishes a very bitter acrid fixed oil which is used as an illuminating oil, in dyeing cotton fabrics, and medicinally as an anthelmintic and as an embrocation in rheumatism. The seeds are used as an insect poison and in the preparation of a hair wash. The gum that exudes from the bark is regarded as a stimulant.

M. azederach (Sans. *Mahanimba* ; Hind. *dek* ; Eng. Indian lilac ; Fr. *cyrouenne* ; Ger. *gemeiner Zedrach*) a tree growing 30 to 50 feet in the sub-Himalayas, Persia. China and Syria with bipinnate leaves and large clusters of fragrant liliac-colored blossoms ; its wood is hard and finely marked. Its sweetish berries are slightly poisonous. The decoction on the bark is cathartic and emetic, and of the root-bark an efficient vermifuge. The leaves are regarded as astringent and stomachic, and are used locally in ringworm. **M. superba** whose dried fruit is known as *kala khajur* or *kuru khajur* (black or bitter date), having a bitter nauseous taste, and which is used in colic.

117. **Nili ; Indigofera**, a large genus of leguminous herbs or shrubs of Papilionaceæ, tribe Galejeæ, type of the sub-tribe Indigoferæ, including about 350 species,

indigenous to tropical regions of Asia, Africa and America. They are herbs or shrubs with pinnate or digitate leaves, small rose-colored or purplish flowers in axillary spikes or racemes and two-valved legumes. Some of the species yield indigo. But the indigo does not exist ready made in the plant, but is produced by the decomposition of a glucoside-*indican*. The plant is bruised and fermented in vats of water, depositing a blue substance, which is collected and dried, and which is commercially known as *indigo*. The cultivation of the indigo-plants and the production of indigo have suffered tremendously by the invention of the new process of the manufacture of aniline dyes which can be produced at a cheaper cost and almost infinite grades of fast colors. *I. angustifolia* (Sans. nilini; Ben. nila; Fr. indigotier a feuilles étroites), a straight-leaved species found in Bengal and East Indies, yielding indigo. Its root is used as a bitter tonic and febrifuge. *I. argentea* (Syn. *I. articulata*; Fr. indigotier argenté; Ger. ägyptische Indigopflanze), a white-colored species found in Egypt, Arabia, Bengal and East Indies. The roots and the leaves are used as a bitter tonic and in calculous affections. In Egypt the seeds are used as vermifuge. *I. aspalathifolia*, a species found on waste land in Bengal, where the leaves, flowers and the tender shoots are used in decoction as a cooling and demulcent drink, and in elephantiasis and cancer. The root is given in toothache and in aphthae, and the oil, the root yields, as an ointment in erysipelas. The ashes of the burnt plant are used for using dandruff, and the leaves as an application to abscesses. *I. cærulea* (Sans nilika; Fr. indigotier bleu), a species found in Bengal yielding a light-blue

indigo in large quantity, *I. enneaphylla* (Fr. indigotier a neuf feuilles ; Ger, neunblättrige Indigopflanze), a species distinguished by nine leaves, found in Bengal and East Indies, where its juice is given as an alterative and antiscorbutic, and the infusion of the plant as a diuretic in fevers. *I. frutescens*, a species found in Bengal and East Indies. Its decoction is given in calculus. *I. glabra* (Fr. indigotier glabre), a smooth and hairless species found in East Indies and Bengal, where the root is used for calculus affections, leaves as a bitter tonic and febrifuge, and as an external emollient application. *I. hedysaroides*, a species found in the East Indies where it is used in calculus. *I. hirsuta* (Fr. indigotier velu) a species found in Bengal and East Indies, distinguished by a hairy coating. Its decoction is given in cerebral disorders. *I. paucifolia*, a wild species with few leaves, found in Bengal and East Indies, where it is used as an antidote to poisons, the root boiled in milk as a purgative, and the stem in decoction as a gargle in mercurial salivation. *I. tinctoria*, (Fr. indigotier des teinturiers ; Ger. Färbe-Indigopflanze), the common cultivated indigo plant, indigenous to Bengal, but now introduced throughout the tropics for the indigo it yields. The leaves are considered alterative and are used in hepatitis ; a decoction of the root in calculus ; a poultice of the leaves is applied over the bladder to excite micturition, and the juice of the young branches is used in asthma. *I. trifoliata* (Guj. vekhario), a species found in Gujrat, distinguished by three leaves, which are used as an alterative, nutritiv, tonic, astringent and demulcent.

Pa.

118. Panasa : Artocarpus a genus of artocarpaceous trees, bearing separate male and female flowers, the former on long club-shaped spikes, and the latter in round heads, which soon coalesce into a fleshy mass rich in starch (bread-fruit), which is largely used as food in the Pacific Islands and in India. *A. blumei*, a species growing in Java and Malabar with edible fruit. The fruit also yields an oil which is used in cookery and in diarrhoea. An ointment of the buds and leaves is applied to buboes and hemorrhoids. *A. chaplasha*, a large tree about 50 to 60 feet high, growing in Chittagong and Assam, supplying timber. *A. incisa* (syn. *A. communis* ; Eng. bread-fruit tree of the South Sea Islands ; Fr. Arbre a pain ; Ger. Brodfruchtbaum), a tree of 50 to 60 feet in height, with rough, dark-green lobate leaves, and a rounded greenish edible fruit of the size of a man's head, which consists internally of a whitish pulpy mass, resembling fresh bread in texture, and forms one of the staple articles of food in the Pacific Islands, where the tree is extensively cultivated, it being a native of Java. The fruit is roasted before eaten, though somewhat insipid in taste. The seeds are also roasted or put into curry, and eaten like chestnuts. The fresh flowers are made into acidulous conserve. The juice of the tree contains caoutchouc. The ashes of the leaves, mixed with cocoanut oil, are used in skin-diseases. *A. integrifolia* (Sans. panasa ; Ben, kâthāla ; Hind. katahara ; Guj., Man. phānasa ; Eng. jack-fruit ; Fr. jaquier ; Ger. indischer

Brodbaum), a species found throughout tropical India, differing from *I. incisa*, in having the leaves entire, The fruit is nearly 20 to 30 pounds in weight, ovoid-oblong in form. When ripe, the golden-yellow pulp of pleasant sweetish taste and aroma, is eaten. The seeds are roasted or cooked as vegetables. When the fruit is immature, it is esteemed as a vegetable. A decoction of the root is used in diarrhœa, and externally in skin-diseases, and concretions forming from the exudations of the root in diarrhœa. The wood is yellow or brown, compact and moderately hard, taking a good polish. *A. lakoocha*, a species found in Bengal where its acid and astringent spadix is eaten in curry. *A. parvifolia*, a species found in Bengal and the East Indies with edible fruit.

119. **Palāsa** : *Butea*, a genus of papillionaceous shrubs and trees, natives of tropical India, yielding a kind of kino. *B. frondosa* (Sans., Ben palāsa ; Hind. dhārā ; Mar. pallasa ; Fr. butœe feuillue), a species common throughout tropical India, conspicuous for its abundant bright orange-red flowers which yield a yellow dye. The seeds yield an oil (moodooga oil) which is used as an anthelmintic. Stick-lac is produced from an exudation from punctures of the twigs made by a coccus. From wounds made in the bark, a reddish astringent juice exudes which hardens into a red brittle resin (magugo Bengal kino), which is used in tanning. And cordage is made from the fibre of the bark. *B. parviflora*, a climbing shrub found throughout India, distinguished by its very small flowers, and whose gummy exudation is used in colic and hysteria. *B. superba*, (Sans., Ben. kimsuka ; hind. kesu), a shrub found throughout India, supplying a kind of kino, and the flowers a yellowish dye.

120. Parpati : Hedyotis, a genus of dicotyledonous sympetalous plants belonging to the family Rubiaceae, tribe Hedyotideae, scarcely distinguishable from Oldenlandia to which it is identified by some botanists. There are about 80 species, chiefly natives of tropical Asia with mostly narrow opposite leaves, persistent, often dissected setose stipules connate with the petioles in a sheath and small white flowers in terminal or axillary cymes. **H. auricularia** (Fr. hedyotis auriculaire. wahres ohrkraut), a species found in Bengal and the East Indies, where it is used in deafness, and the leaves are employed as an emollient application to abscesses, and in a salve for wounds. **H. umbellata** (Sans. ranjanā ; Tam. sayā ; Tel. cherivelu), a species much cultivated on the Coromandel coast, indigenous to Rameswaram Island, for the sake of its root (chay-root) which gives the best and most durable red dye for cotton cloth. The leaves are considered expectorant, and in dry powder made into cakes with flour and used in asthma and phthisis.

121. Palāndu : Allium, a genus of bulbiferous liliaceous plants, belonging to the tribe Asphodelae, comprising about 275 species, mostly natives of northern temperate zones, characterized by tubulated leaves, swelling pithy stalk, a peculiar pungent odor of the plant, especially the bulb, and having white or rose-colored flowers in an umbel with straight stamens at the summit of the scape. **A. cepa** (Sans. palāndu ; Ben. peyāj ; Hind. piyāj ; Eng. onion ; Fr. ognon commun ; Ger. Zwiebel), a biennial garden herb, distinguished by having a naked fistulous scape swelling at the base, longer than the leaves which are fistilous and terete, and bearing at its summit a large globose umbel of greenish-white flowers.

The bulb is round or oblong and not compound, and consists of a series of concentric tumicated layers, the outer dry and membranous, the inner fleshy and succulent, and with situation and race varies much in size, in color which runs from dark-red to white, and in the degree of characteristic pungency which is greater in the small red onions than in the larger kinds. The bulb is stimulant, expectorant and diuretic, and has been given in infantile catarrhal affections, in dropsy and in calculi ; externally it acts as a mild irritant by virtue of a volatile oil which it contains, and is applied hot to the ear for the relief of earache, to the soles of feet as a derivative in convulsive disorders, and as a discutient application to inflammatory swellings. *A. leptophyllum* (Sans. lasuna ; Ben. rasuna ; Hind. lasūna ; Eng. wild garlic ; Fr. ail leptophylle ; Ger. Knoblauch), a species of narrow-leaved garlic, found in Bengal and the East Indies. It is a perennial herb with a scape about 2 feet high, having narrow linear-lanceolate leaves, pink or purplish flowers with tricuspidate stamens, and a compound bulb, consisting of several bulblets (cloves) inclosed in a common scaly membrane, from which they are easily separable. These bulblets are oblong, laterally compressed, rounded on the back, and wedge-shaped anteriorly, and consist of an envelope of fleshy scales surrounding a fleshy centre. They have a pungent, disagreeable odor and acrid taste, especially to those who are not accustomed to eating garlic, due to the presence of I p. c. of a nauseous volatile oil (oil of garlic), which in the crude state is a brownish-yellow liquid, heavier than water, made up of a mixture of allyl sulphide and oxide, but which when rectified, is colorless and lighter than

water, and consists mainly of allyl sulphide. Garlic also contains a little albumin, starch and sugar, 35 p. c. of mucilage, and from 50 to 60 p. c. of water. It is a stimulant tonic and promotes digestion. It has also diuretic and sudorific properties, and is a good expectorant. *A. sativum*, the cultivated variety of garlic, probably a native of Central Asia, now extensively cultivated in all warm regions. *A. tuberosum* (Fr. ail tubereux), a species distinguished by tuberous bulb, cultivated in upper India.

122. *Palakya* : *Spinacia*, a genus of the apetalous plants, of the family *Chenopodiaceæ* and the tribe *Atripliceæ*. It is characterized by bractless and commonly dioecious flowers, the pistillate with a 2 to 4-toothed roundish perianth, its tube hardened and closed in fruit, covering the urticle and its single erect turgid seed. There are 2 species, natives of the orient. They are erect annuals, with alternate stalked leaves which are entire or sinuately toothed. The flowers are borne in glomerules, the fertile usually axillary, the staminate forming interrupted spikes. *S. glabra* (syn. *S. inermis* ; Ben. *pālam-sāka* ; Fr. *epinard lisse* ; Ger. *glattfrüchtiger Spinat*), a species found in Bengal and the East Indies with rounded seed, and large, rounded at the base, and smooth succulent which when boiled and seasoned form a pleasant dish. It contains a good deal of iron. *S. oleracea* (*S. spinosa* ; Eng. *spinach* ; Fr. *epinard cornu* ; Ger. *Gemüsespinat* ; Hind. *palkī* ; Mar. *pālakḥ*), a species supposed to be a native of Western Asia, now extensively cultivated in all warm countries as garden vegetables. It has sagitate, undivided and prickly succulent leaves, which when boiled and seasoned form an

excellent dish. The herbaceous parts are mildly laxative, and they are used as an emollient poultice.

123. Pāniyamalaka : *Flacourtia*, a small genus of thorny shrubs or small trees, type of the family Flacourtiaceæ, natives of tropical Africa and Asia. The fruit of most of the species is edible. *F. cataphracta* (Hind. pañi-amlā ; Mah. pāñāmbalē), a species found in upper and western India, whose fruits are eaten like plums which they resemble, and the bitter and astringent leaves and tender shoots are given in diarrhœa and dysentery, and the bark in infusion as a remedy for hoarseness. *F. sapida*, a species found in Bengal, the fruit of which is eaten, though not very palatable. Its thorns are used to open the pustules of the smallpox on the ninth or the tenth day. *F. sepiaria*, a species common in the eastern coast of India and the East Indies, where the leaves and roots are given in infusion in snake-bites, and the infusion of the bark in oil externally in rheumatism. On the Malabar coast the bark is rubbed with oil, and used as a liniment in gout. The fruit is eaten.

124 Paribhadra : *Erythrina*, a genus of leguminous shrubs or trees, comprising about 50 species, mostly tropical with trifoliate leaves and scarlet spikes, followed by long constricted pods inclosing bright-red seeds. *E. indica* (Sans. mandāra ; Ben. mādāra ; Hind. pharhad ; Eng. coral tree ; Fr. arbre immortel ; Ger. indischer Korallenbaum), a spiny species found in tropical India, and whose leaves and bark are considered febrifuge, and are used as an emmenagogue. *E. stricta*, a species found in Malabar and used like *E. indica*.

125. Pata : *Corchorus*, a genus of the Tiliaceæ, indigenous to Australia and the tropics of both hemis-

pheres. They are herbs or small shrubs with serrated leaves and small flowers. *C. capsularis* (Ben. pāta ; Eng. jute plant ; Fr. corchore capsulaire), a species distinguished by small and globular pods, extensively cultivated in eastern Bengal for the jute which is obtained by maceration of the inner bark. The fibre is soft, silky glossy and of fair tenacity and susceptible of so fine division as to mix well with silk, and can take on a bright and permanent coloring. *C. decemangularis* (syn. *C. olitorius*), a species by elongated and cylindrical pods, cultivated in Bengal for the fibres which are employed for making coarse gunny cloth. It is cultivated in Palestine, and its tender leaves are eaten by the Jews as salad (Jew's mallow). In India the tender leaves and shoots are eaten as vegetables. *C. humilis* (Mar, bāhu phāli), a small prostrate weed found in western India. It is mucilaginous and somewhat astringent, and reputed to be restorative, demulcent, emollient and diuretic ; and in infusion and decoction it is given as an aphrodisiac, and in gonorrhea, seminal debility and urinary diseases.

126. **Pisān-vedaka : Coleus**, a genus of labiate annual herbs and shrubs of tropical Asia and Africa in general cultivation for their brilliant foliage. **C ambo-
lnicus** (syn. *C. aromaticus* ; Ben. pāthar-kuchi) a native of Cochin-china and Bengal. The leaves are eaten as vegetables and are used medicinally as a carminatic, litholytic, and in asthma and coughs. *C. batbatus*, a native of Egypt and Arabia where it is used as a diuretic and to hasten menstruation. In western India, where it is cultivated in the gardens, roots are used for pickles. *C. carnosus* (pāthānveda), a species found in upper India, where the leaves are used in asthma, colic, and

dyspepsia. *C. malabaricus*, a species found in Malabar and the East Indies with aromatic leaves. Its root is used in dysentery and stomach complaints. *C. scutellarioides*, a species found in central India, where the root is used in dysentery and digestive disturbances.

127. **Pippali:** *Piper*, a genus of dicotyledonous apetalous plants, the type of the family Piparaceæ, characterized by 2 to 6 stamens with distinct anther-cells, and an obtuse or slightly beaked ovary crowned with from 2 to 5 stigmas, becoming in fruit small berry. There are about 650 species widely dispersed over the tropics. They are most commonly joined shrubby climbers, rarely trees or tall herbs, bearing alternate entire leaves with several or many conspicuous nerves, and large and often wing-like stipules. The flowers are densely packed together in cylindrical stalked spikes (or in a few species in racemes)—at first terminal, soon become the opposite leaves (as in *Phytolacca*), pendulous and slender with disocious or perfect flowers without calyx or corolla each with a shield-shaped protecting bract. *P. betle* (Sans. *tāmbula* ; Ben. *pān* ; Fr. *betel* ; Ger. *Betelpfeffer*), a species indigenous to Java, but extensively cultivated in the East Indies and the tropical India for its leaf which is chewed with areca nut, quicklime and aromatics, as a masticatory and stomachic stimulant. It is also reputed to be a mild aphrodisiac. The leaves warmed and smeared with old clarified butter are applied over the chest in pulmonary affections and congestion of the liver, and as a resolvent in glandular swellings. The juice of the leaf, mixed with the juice of the fresh ginger is used as a pectoral. *P. chaba* (Sans. *chabya* ; Ben. *chai* ; Ger. *Chaba-Pfeffer*), a species found in the East Indies and the

eastern coast of India. Its fruit-spikes are used as stomachic and digestive stimulant. The root is used as appetizing and carminative. *P. cubeba* (Ben. kabeb ; Eng. cubeb ; Fr. poivre cubebe ; Ger. Cubeben-Pfeffer) a climbing shrub, indigenous to Java, Borneo and Sumatra, and cultivated in Malabar. The unripe fruit, as found in commerce, consists of the dried globose fruit of the plant, of about the size of a small pea, of a grayish-brown color, and covered with an ashy-gray bloom. It is strongly wrinkled by the shrinking of the fleshy pericarp, and is furnished with a short stalk. The shell is hard and containing a single seed with a whitish oily albumen. Cubeb has a strong taste with some bitterness and acidity and a highly aromatic odor, and chemically consists chiefly of a volatile oil—Cubebin, Cubebic acid, gum, a fatty oil, and malates of magnesium and calcium. It is stimulant, expectorant, and has been much used in gonorrhea, as well as in leucorrhea, cystorrhea, the urethritis of women and female children, abscess of the prostate gland, hemorrhoids, chronic bronchial inflammation and diphtheritic affections of the throat. *P. Longum* (Sans. pippali ; Ben. pipūla ; Hind. pīpala ; Eng. long peper ; Fr. poivre long ; Ger. langer Pfeffer ; anc. gr. pipeli macron), a shrub indigenous to Malabar, Ceylon and eastern Bengal. Its root (Sans. pippali-mūla ; Ben. pipula-mula ; Hind. piparā mūla) is bitter, stomachic and digestive, and is used in palsy, tetanus, apoplexy, and to cause expulsion of the placenta. The fruit is a stimulant of digestion, and yields to aqueous distillation a thin and colorless volatile oil. It is less powerful than *P. nigrum* with which it is often commercially adulterated. *P. nigrum* (Sans. maricha ; Ben. kāla pipūla ; Hind. kāli-marich ; Eng. black pepper ;

Fr. poivre noir ; Ger. schwarzer Pfeffer), a perennial climbing shrub found in Malabar and cultivated in the tropics for unripe fruits which are small berries, pungent and spicy to the taste, and of aromatic odor. It contains piperine, volatile oil, pungent resin, fatty matter, etc. Pepper is an irritant externally and internally. Owing to its pleasant pungency it is largely used as a condiment. It is decidedly stimulant to the digesting organs and to the circulation, and also, but to a less degree to the kidneys, as it passes out of the body by the urine. In flatulent dyspepsia and feeble digestion, pepper may be advantageously taken, but if taken in excessive quantities, its local action is sufficient to excite inflammation of the gastrointestinal mucous membrane. *P. silvaticum*, a species found in Bengal whose fruits are digestive and stimulant,

128. Priyāla : *Buchanania*, a genus of dicotyledonous, archichlamydeous anacardiaceous trees, abounding in acrid, resinous milky juice, with alternate leaves, small flowers in panicles, and the fruit is a one-seated, one-celled drupe. *B. angustifolia* (Ben. piyāla), a species found in Bengal with edible fruits. *B. lancifolia*, a species found in the eastern coast of India, where its unripe fruit is eaten in curry. *B. latifolia* (Sans. priyāla ; Hind. niyē-veru), a species found in upper India where the seeds are eaten which furnish 'cheroonjee' oil. A varnish is made from the fruit.

129. Pīlu : *Salvadora*, a genus of sympetalous shrubs or trees, type of the family Salvadoraceæ. It is characterized by a bell-shaped calyx and corolla, four stamens at the base or middle of the corolla, a one-celled ovary with one ovule, very short style, and a broad, peltate, stigma, the ovary becoming in fruit a globose

drupe with papery endocarp and single erect seed. There are 2 species, natives of India, western Asia and northern and tropical Africa. They bear opposite entire thickish, commonly pallid leaves, and small flowers on the branches of an axillary or terminal panicle. *S. oleoides*, a species found in tropical India, whose young branches are used for brushing the teeth and strengthening the gum. *S. persica* (*S. wightiana* ; Fr. *Salvadore de Perse* ; Ger. *persische Salvadore* ; Sans., Hind. *pīlu*), a species distributed from northern India to Africa. The tonic and stimulant bark of the trunk is used in low fevers, amenorrhœa, the acrid root-bark as a vesicatory, the purgative leaves as an anthelmintic, and the branches for cleansing the teeth. The dried berries are regarded as an aphrodisiac.

130. **Punarnavā** : *Bœrhaavia* a genus of tropical nyctaginaceous herbs. *B. diffusa* (Sans. *punarnavā* ; Hind. *pāngtri*), a perennial species growing in India, the juice of whose leaves is used in hepatic disorders, and the root as a purgative. *B. procumbens*, a species growing in northern India, which is used as a purgative, anthelmintic and febrifuge.

131. **Pepē** : *Carica papaya* (Ben. *pepē* ; Eng. *papaw* ; Fr. *papayer commun* ; Ger. *Melonenbaum*), a tree of palm-like appearance about 20 feet high, indigenous to South America, now cultivated in Bengal, crowned with long-petioled palmately 7-lobed leaves about 2 feet in diameter borne on foot-stalks 2 feet long, and clusters of dioecious flowers. The oblong yellow fruit is very large, of an oblong form, ribbed and having a thick orange-colored fleshy succulent rind, containing numerous black seeds. When ripe, the soft pulp is eaten which has a

pleasant sweet taste. Otherwise it is boiled and eaten as a vegetable. The juice of the unripe fruit contains an albuminoid substance—papain or papayotin, which gives it a peptonising property. A similar property seems to reside in other parts of the plant, as meat wrapped in the leaves or suspended from the branches, and also the flesh of the animals feeding upon the leaves and the fruit, are rendered tender. The milky juice is also said to exert a solvent effect upon the circulatory blood. Taken internally undiluted, it is acrid and may cause severe gastro-enteritis, acting as a powerful cathartic. Together with the seeds and the milky juice of the plant, it is employed as an anthelminthic. The juice of the fruit-pulp is used to remove freckles. The leaves are saponaceous.

132. **Potaki**: **Basella**, a genus of climbing chenopodiaceous plants of the suborder Basellaceæ characterized by flowers with 2 sepals, 5 petals, 5 stamens opposite the petals, a 3-merous gynoecium and utricular fruit. **B. alba** (Ben. puī-saka; Fr. baselle blanche, epinard de la Chine), a white species, cultivated in China, East Indies and Bengal where its leaves are eaten boiled, and used as an emollient application to ulcers, and to hasten maturation of abscesses, and as a laxative. **B. cordifolia**, a species cultivated in southern China, East Indies and Burma for the edible leaves and the purple dye its fruit furnishes. **B. lucida** (Sans. mālavā; Hind. potkā; Fr. baselle brillante), an annual species cultivated in upper India with shining leaves which are eaten. **B. rubra** (sans. potaki; Fr. baselle rouge), a much-branched biennial twinning herb, trained over the trellises and houses, and its succulent leaves and twigs are eaten as pot-herb. This is also known as Malabar nightshade.

The juice of its leaves is used in infantile catarrh, and the fruit furnishes a red pigment. It is considered by some as a variety of *B. cordifolia*.

Bha.

133. **Bhangā**: *Cannabis indica* (Fr. chanvre de l'Inde; Ger. indischer Hanf), an Indian variety of *C. sativa*, a native of western Asia, now naturalized throughout Europe and America, an erect branching herb from 4 to 10 feet high, with a rough angular stem, small green or whitish flowers, and petiolate leaves divided into from 5 to 9 lanceolate or linear acuminate, serrate leaflets. Its fruiting top, agglutinated with resin constitutes *ganga*, while the leaves or the small stalks are the *bhan* or *siddhi*; the impure resin obtained by scraping the tops of the plant, is known as *charasa*. The herb has a peculiar heavy odor and a bitter acrid taste, and contains a volatile oil composed of cannabene, cannabene hydride, several alkaloids (cannabinine, tatano-cannabinine etc), cannabinone, and cannabin the latter being the chief ingredient. The resin appears to be, or to contain the active principles, having two principal ingredients, a volatile alkaloid—Cannabinine, and a yellow aromatic volatile oil. Several terpenes and Cannabinol oil have been also separated by some. The drug acts like opium, in first stimulating the nervous system, and afterwards depressing the vital functions. The primary stage of intoxication is accompanied by exhilaration, which

lasts for some time before sleep occurs. During the period imagination is actively engaged, intent upon visions of its own creation, which are at first pleasant, but become gradually distorted. It is noticed, as one of the first manifestations of its toxic effect, that the ideas of time and space are disturbed and become often exaggerated; there is often a curious sense of double consciousness. It is used medicinally as an antispasmodic, antipruritic, antalgastic and hypnotic, and it is reputed also to be aphrodisiac. It has also been used with great advantage in various nervous conditions (delirium tremens, the delirium of fever, insanity, tetanus, and migraine), and in uterine hemorrhage.

134. **Bhārgī** : *Clerodendron*, a genus of verbenaceous shrubs and trees, containing about 87 species, found chiefly in tropical Asia, distinguished by showy flowers with campanulate calyx and a corolla with slender tube and spreading limb. *C. inerme* (Fr. volkameria; Sans. aiguillons; Hind. bin-jomā), a spineless species found in upper India, where the juice of the root and the leaves is employed in venereal and scrofulous diseases, also as a febrifuge and tonic as a substitute of quinine. *C. infortunatum*, an undershrub of a disagreeable odor, found in central India, the leaves of which are used in infusion as a bitter tonic, antiperiodin and vermifuge. *C. phlomidis* (Fr. clerodendron a feuilles de phlomis), a species found in the Gāngetic valley the juice of whose leaves is used as an alterative, and a decoction of the root as a demulcent in gonorrhea. *C. serratifolium* (Ben, bāman-hāti), a species growing about 8 feet high in eastern India, especially in Bengal, where its root is used as a bitter tonic, as a remedy for asthams, cough, scrofula; the

leaves are employed as a bitter tonic; and applied in the form of poultice to hasten suppuration.

135. Bhurjja-patra : *Betula bhojpatra*, a species of hardy birches found in the north-western Himalayas and Japan. Its leaves (*folia betulæ*) are used as diaphoretic and in gout, both internally and externally. The bark is pale-whitish with dark streaks, and peels off in layers, which are used for writing ancient sacred texts, and magic mystic words. On distillation with water, the buds and twigs furnish a colorless pungent balsamic oil (oil of birch), which is antiseptic, antipyretic and is used in articular rheumatism. On dry distillation, the bark and the wood yield birch-tar (*oleum betulium*), a dark-reddish brown substance which is used externally in rheumatic pains. The inner bark (*cortex betulæ*) is aromatic and somewhat astringent, and is used externally in itch and scrofula.

136. Bhallātaka : *Senecarpus*, a genus of choripetalous trees, of the family *Anacardiaceæ*. It is characterized by simple flowers with fine imbricated petals, 5 stamens, a one-celled ovary with 3 styles, and a single ovule pendulous from the apex. There are about 40 species, chiefly natives of hilly tropical India, East Indies, and especially Ceylon. They are trees with alternate coriaceous leaves and small flowers in terminal or lateral bracted panicles, followed by hard kidney-shaped nuts with a thick resinous cellular pericarp, the source, in the leading species of an indelible ink, and after ripening of a varnish and a corrosive substance. *S. anacardium* (Sans. *bhallātaka* ; Ben. *bhelā* ; Hind. *bhilāvā* ; Eng. marking-nut, Fr. *anacardier* ; Ger. *ostindischer Dintenbaum*), a species found in the hilly places of tropical India, Ceylon

and the East Indies. The black hard nut (fructus semicarpi) contains a resinous corrosive juice which is used by laundry-men to make indelible marks on the cotton clothes. Medicinally it is used as rubefacient, and internally in leprosy. The nut also yields an acrid viscid oil which is used as a counter-irritant, but which often provokes erythema, and internally as a narcotic stimulant. The kernels yield a rubefacient oil. The farina of the anthers is irritating and narcotic, often producing in persons that sleep under the tree when it is in blossom, stupefaction and swelling of the face and the limbs. The fleshy corolla and the receptacle are roasted and eaten by the Santhals. *S. cassuvium*, an acrid species indigenous to Moluccas. having almost the similiar properties.

Ma.

137. *Makhanna* : *Euryale Ferox*, (Ben. mākhānā ; Hind. makhānā) a water-lilly with large peltate leaves and spiny calyx of the genus *Euryale* of which it is the only species, found in upper and western India, where its seeds are much used as an article of food, and a tonic.

138. *Mānjisthā* : *Rubia*, a genus of sympetalous plants, including the madder, type of the family Rubiaceæ, belonging to the tribe Galieæ, distinguished from the closely related *Galium* (bedstraw) by flowers with parts in fives instead of fours. It is further characterized by the absence of an involucre from the flowers by a roundish calyx-tube without borders, a wheel-shaped corolla, 5 stamens, a minute disk, an ovary commonly 2-celled and

2-ovuled, forming a small fleshy twin-fruit. There are about 38 species, natives of the Mediterranean region, tropical and temperate Asia, South Africa, tropical and temperate South America. They are herbs with elongated angled stems, which are commonly rigid or minutely prickly, and with two large thickened root, sometimes 3 feet long. They bear whorled lanceolate or obovate leaves, usually four at a node, and small flowers in axillary or terminal cymes with their pedicles jointed under the calyx. **R. cordifolia** (Ben. manjisthā; Hind., Guj. Majitha; Eng. Bengal madder, munjeet; Ger. Farberwurzel), a native of India, Eastern Asia, and parts of Africa, affording *garancin* which yields a dyestuff of great permanence, and which is used in dying cotton and linen red. The coloring principle of madder is *alizarin*. Madder also contains a red pigment *purpurin* or *rubiacin* which is extracted in the form of orange-colored prismatic crystals, and yields a good dye, either alone or in combination with *alizarin*. Through the peculiar chemical affinity of phosphate of lime, for its coloring matter, madder is noted for its remarkable physiological effect of turning red the bones of animals to which it is fed, as well as the claws and beaks of birds. Madder-colors range from brown, through yellow, rose, red to deep purple, and are much used in dying and fine arts. Medicinally the madder-root is used as a deobstruent in scanty local discharge.

139. Madana-phala : *Randia*, a genus of sympetalous plants of the family Rubiaceæ and tribe Gardenieæ. It is characterized by hermaphrodite and axillary flowers, united style-branches, bearing a club-shaped or fusiform stigma, a two-celled ovary with many ovules, seeds with membranous coats, and short intrapetiolar stipules, which

are almost connate. There are about 100 species, natives of tropical regions, especially of Asia and Africa. They are trees or shrubs, erect or climbing, with or without thorns, and bearing opposite leaves which are obovate or narrower, and either small or large flowers which are solitary or in clusters, and white or yellow, rarely red. The fruit is many-seeded, two-celled roundish berry. **R. dumentorum** (Sans. madana-phala; Hind. main-phala; Tam. maduka-kuraya), a small thorny tree, widely distributed from Africa to Java, used throughout India as a hedge plant while its fruit (Eng. emetic nut) is used medicinally as a powerful emetic, as a nervine, antispasmodic and cardiac excitant, and as an external anodyne in rheumatism. The bark is also used as an emetic. And the fruit like the *Cocculus indicus*, has the property of stupefying fish. **R. longiflora**, a species found in Bengal, the bark of which is used in intermittent fever.

140. Madhuka : Bassia, a genus of dicotyledonous trees, belonging to the family Sapotaceæ. About 30 species are known, natives of tropical India. **B. butyracea** (Ben. phuloār; Fr. arbre a beurre; Eng. Indian butter-tree), a tree about 70 feet high growing in the subtropical regions of the eastern Himalays. The fruit is edible, and from its kernels, a yellowish-white fatty substance (Ben. chūrī) is expressed. It is used as an application in rheumatism and contractures, as an emollient for chapped hands, as a dressing for the hair, and to adulterate ghee. It is also used for illumination and soap-making. The fleshy flowers furnish a kind of sugar resembling date-sugar. **B. latifolia** (Syn. *Madhuca indica*; Ben. mouoyā Hind. mahuvā; Eng. mahwah tree; Fr. illipē a larges feuilles), a tree 40 or 50 feet high growing throughout

Central India. The flowers contain a large amount of saccharine matter, and they are eaten by the Santhals. On distillation, they furnish a kind of liquor, somewhat resembling Irish whiskey, which owing to the large amount of empyreumatic oil that it contains, is apt to cause gastric irritation in large doses. On expression, the kernels yield a concrete oil (mowah oil) which is used to adulterate *ghee*, for illumination and for making soap. The oil-cake is used for poisoning fish and as an emetic. **B. longifolia**, a tree from 40 to 50 feet high growing in Malabar and Ceylon. The fleshy and sweetish flowers, roasted or boiled are eaten. A yellowish oil (illoopay-oil) expressed from the ripe fruit is used as an external application in rheumatism and paralysis, to adulterate *ghee*, and for candle-making. A gummy juice obtained from the trunk is used in rheumatism, and the bark is employed as an astringent and emollient, and as a remedy for the itch.

141. Maduka : Glycyrrhiza glabra (Ben. yasthi-madhu ; Eng. licorice ; Fr. bois doux ; Ger. Süssholz), a perennial herbaceous plant, growing 4 or 5 feet high, sparingly branched with pinnate leaves and bluish pea-like flowers in spikes. The roots grow several feet long and an inch or more thick. The commercial licorice root is derived from two principal varieties. 1. *G. glabra* (atypica), a glabrous plant indigenous to southern Europe, Caucasus and northern Persia. 2. *G. glabra* (g-glandulifera), a plant with pubescent or roughly glandular stems, growing in south-eastern Europe, Persia, Turkestan, Afghanistan and north-western Himalayas. Licorice-root contains glycyrrhizin, asparagin, starch, albumen, an acid resin, lignin, a nitrogenous matter, calcium and magnesium salts, and phosphoric, sulphuric and malic acids.

It is a good demulcent, and is used in the catarrhal or irritated condition of bronchial tubes, bowels and urinary passages. It is also much employed to mask the taste of bitter or acrid drugs, and to sweeten tobacco. **Abrus precatorius** (Eng. wild licorice, jequirity), a leguminous woody twiner, indigenous to tropical India, where its root which contains about 15 p. c. glycyrrhizin and 8 p. c. of an acrid resin, is often substituted for licorice. The leaves also contain about 10 p. c. of glycyrrhizin, and a decoction made out of them is used in Malabar for cough and affections of the throat. Its polished round seed, (Ben. ratti ; Eng. crab-eye beans ; Fr. pois rouge des Indes ; Ger. indianische röhre Erbsen) of the size of a small pea, of a bright-red color with a black spot at the hilum, is used by the Hindu jewellers and druggists as a standard of weight (ratti : 2. 1875 grains). It contains a few poisonous principles—a globulin, an albumose, but no alkaloid, and its action resembling to that of the bacterial toxin or the venom of the snake. The temperature is lowered by the injection of its infusion into the circulation of the lower animals, and death takes place by cardiac depression, and the blood remains fluid after death. This poisonous property has been utilized by ophthalmologists of exciting an artificial purulent ophthalmia for the cure of pannus, granular lids or trachoma.

142. Manhsilā : Realgar (Hind. mainsila ; Lat. arsenicum rubrum, sandaraca ; Fr. sulphure rougé *arsenic*, *bisulphured arsenic* ; Ger. Arsensulphür, rothes rauschgelb) arsenic disulphide, a combination of an equal number of arsenic and sulphur atoms, occurring native as resinous looking translucent prismatic crystals—red sulphuret of arsenic. Realgar differs from orpiment (Sans. haritāla)

in that, orpiment is composed of 2 atoms of arsenic and 3 of sulphur (arsenic trisulphide), and has a yellow color. Arsenic disulphide combines with basic sulphides to form compounds, known as *hypothio-arsenites*. It is used in tanning and pyrotechnics. It has been used as a disinfectant in external ulcers.

143. Maricha : Capsicum, a genus of herbaceous or shrubby South American plants, of the family—Solanaceæ, with a wheel-shaped corolla, projecting and converging stamens, and a many-seeded berry. Many of the species are now extensively cultivated in all warm countries of both hemispheres with numerous varieties, for their fruit which contains an aromatic and pungent principle—*capsicin*. The fruit or the pod is fleshy, and is very variable in shape and color, and sometimes inflated and as large as an orange. *C. annum* (Ben. *kāchā maricha* or *lankā*; Eng. red pepper, chillies; Fr. *piment des jardins*; Ger. *ein jährige Beissbeere*, spanisher Pfeffer) an annual herb, indigenous to South America, but now cultivated throughout the temperate zone, having ovate, acuminate leaves, white nodding flowers, and conical or globular red or yellow fruit from two to four inches in length, and from one to one and half inch thick. It has a peculiar pungent odor and sharp burning taste, and incloses numerous disc-shaped yellowish seeds. The smallest varieties are known as *Cayenne pepper*. The chief constituent of the red pepper is a crystalizable acrid substance *capsaicin*, also a yellow oil, resin and a volatile alkaloid which in its odor resembles coniine. It is usually used as a condiment, and medicinally as a rubefacient and vesicant, as a gargle in putrid sore throat, as a torpid condition of the stomach

and the intestines. It occasions irritation when applied to the skin, and acts as a counter-irritant in relieving pain in structures beneath, especially in neuralgia and subacute gout. Internally it stimulates the action of the heart, increases the digestive function, promotes the excretion of urine, and possesses an aphrodisiac influence. In the mouth the taste is hot and pungent, causing free flow of saliva, and similarly increasing the flow of the gastric juice, producing warmth in the stomach and expelling flatus. However overdoses are easily apt to give rise to subacute or chronic gastritis. Excessive amounts cause severe pain, vomiting and purging. Numerous varieties are extensively cultivated and used in Bengal and Madras. *C. fastigiatum*, a small shrub, cultivated widely in tropical India, East Indies, Africa and South America, bearing conical oblong scarlet fruits, about half to three-fourth inch long, and one-fifth inch thick, which contain numerous flat reniform seeds, and have a pungent, peculiar odor, and a very hot and biting taste. They are known as Guinea pepper or chillies. *C. frutescens* (Ger. Cayenne-pfeffer), a species indigenous to Central America, but cultivated in Bengal and Madras. The fruit is an ovate-oblong capsule which is about half an inch long, and one-fourth of an inch thick, having a very sharp biting taste. Dried and powdered, it forms the Cayenne pepper. *C. grossum*, (Ben. dheseo-maricha ; Eng. bell-pepper) a large and inflated variety of *C. frutescens* with very little pungency, growing in western India. *C. nepalense* a Nepal species with great pungency.

144. **Mudga** : *Phaseolus*, a genus of leguminous plants, type of the tribe Phaseoleæ, and the subtribe

Phaseolinæ, distinguished by the spiral keel, orbicular banner, longitudinally bearded style, and flowers clustered above the middle of the peduncle. There are about one hundred and seventy species widely dispersed through warmer regions with many well-marked varieties due to long cultivation. They are twining or prostrate plants with leaves of three leaflets, persistent striate stipules, white, yellowish, red, violet or purplish flowers, and long straight or curving pods. **P. mungo**, (Sans. mugda; Ben. muga; Hind. mūṅg; Eng. hairy-podded kidney-bean; Fr. haricot mungo; Ger. rauhhaarige Bohne), a species found in tropical Asia and Africa. There are two varieties: (a) *P. mungo chlorospermus* (the green gram) which is more esteemed as an article of food; (b) *P. mungo melanospermus* (the black gram) which is extensively cultivated throughout India for the pulse which is the staple source of albuminous supply of the populace, and which is easily digestible, containing very little cellulose, when shelled. **P. lunatus** (Ben. cimrā; Eng. lima bean), a species growing in the tropics with the flat pods, used much as food; it is used as vegetables in Bengal with pods, when young. **P. nanus** (Eng. bush-bean; Fr. haricot nain; Ger. Frühbohne), a species found in Bengal and the East Indies, which grow about six weeks, and they are cultivated for their edible pods, and the small white seeds. **P. radiatus** (Sans. māsa; Ben. māsa-kālāya; Hind. urad; Fr. haricot radie; Ger. strahlfrüchtige Bohne), a species growing in tropical India, where its beans are used as an article of food; the macerated beans are applied to cutaneous affections, and the root, mixed with the bean is given to the horses

as a tonic. The root is supposed to be narcotic. *P. trilobus* (Sans. vana-mudga ; Ben. vana-muga, mugāni ; Fr. haricot a trois lobes ; Ger. dreilappige Bohne) a species common in the Deccan and Bengal where it is used in haemorrhoids and ophthalmia. In Behar the plant is used as a febrifuge. *P. vulgaris* (Eng. common kidney-bean ; Fr. petite feve ; Ger. Faseln), a dwarf annual, indigenous to India, where it is cultivated for its seeds—the white beans, which are chiefly used as food, and medicinally as emollient cataplasms.

145 *Mahāmāsa* : *Dolichos*, a genus of herbaceous or sometimes shrubby leguminous, nearly related to *Phaseolus* but with longer pods, of the tribe Phaseoleæ, natives of tropical Africa, Asia and Australia, with a few species in South America. *D. biflorus* (Sans. kulattha ; Hind. kulthī ; horse-gram : Fr. dolich a deux fleurs), a species indigenous to India whose globular beans are chiefly fed to horses, and in upper India, its flour is eaten by poorer classes. *D. bulbosus* (Fr., dolich bulbeux ; Ger. knollenbohne), a species found in tropical India, distinguished by nodular roundish beans (Ben. colā ; Hind. chana) which are eaten raw or cooked. *D. catjang* (Fr. dolich catjang) a species found in Malabar where the pods and seeds which have an agreeable taste, and rich in fats, are used as tonic foods. *D. cylindricus* (syn. *D. sinensis* ; Sans. rajamāsa ; Ben. baravati ; Hind. loviā) a species with long pods, which are eaten as vegetables when tender, otherwise the ripe dried beans as pulses. *D. fabæformis* (Fr. dolich en forme de fèves), a species found in southern India, having the same properties as *D. catjang*. *D. minimus* (Fr. dolich tres petit), a species found in central India, the

seeds of which are poisonous. *D. lignosus* (Fr. *dolic ligneux*), a species found in western India, the tender leaves and pods of which are eaten as vegetables. *D. soja* (syn. *Glycine soja*, *Glycine hispida* ; Eng. soy bean ; Ger. Sojabohne), a species extensively cultivated in Manchuria, China and parts of India for its seeds which are eaten, and which contain a very high percentage of protein and fat. *D. tranquebaricus*, a species found in northern India, where its fruit is used at food. *D. trilobatus* (syn. *Glycine triloba*), a species found in Bengal and East Indies where its tender leaves are used as a vegetable and as a laxative. *D. uniflorus*, a species found in Central India, having seeds varying in color from light-red to dark-red and black, and possessing astringent, diuretic and diaphoretic properties. A decoction of them is made in urinary diseases, menstrual derangements, and to promote lochial discharge and to check profuse leucorrhœa,

146. **Muchukunda : Pterospermum**, a genus of trees and shrubs of the family Sterculiaceæ. It is characterized by stalked anthers, with parallel linear cells, woody round or five-angular, five-valved capsules and winged seeds. They are commonly clothed with stellate hairs and bear oblique coriaceous leaves, and elongated flowers which are axillary and nearly or quite solitary, and consist of tubular five-cleft calyx with five obovate petals and a prominent column of united stamens. The flowers are usually white, fragrant and several inches in length. *P. acerifolium* (Ben. muchukunda ; Ger. ahornblättriger Flügelsamen) a species growing in Bengal about forty to fifty feet high, and whose yellowish fragrant flowers are used in leucorrhœa, gastralgia, and

the tomentum of the leaves employed as a haemostatic. *P. glabrescens* (Tam, thaddo), a species found in Malabar, where its leaves are used in epididymitis. *P. heyneanum* (Tel. lolanda), a species found on the eastern Indian coast, where its flowers are used in leucorrhœa, and the powdered leaves are smoked in nervous headache. *P. suberifolium* (Hind., Mar., Guj. muchakunda), a species found in southern and western India, resembling *P. heyneanum*, where its flowers are used in leucorrhœa and migraine.

147. **Mulaka** : *Rhaphanus*, a genus of cruciferous plants, including the radish, belonging to the tribe Sinapeae. It is characterized by globose seeds, solitary in the single row of cells formed by the constriction of the pods which are closed by a pithy substance or sometimes remain continuous throughout. There are about ten species which are natives of temperate Asia. They are branching annuals or biennials with fleshy roots, lyrate lower leaves, and elongated bractless racemes of slender-pedicelled white or yellow purplish-veined flowers, followed by erect spreading, thick and corky or spongy pods. The root varies greatly in size (from half an ounce to twenty pounds), in form (being long, tapering turnip-shaped, olive-shaped etc.), and in color (being white, scarlet, pink, reddish-purple, yellow or brown). *R. raphanistrum* (Eng. wild-radish ; Fr. raifort sauvage ; Ger. Bauernsenf), a wild variety found in western Asia, Europe, Cashmere. In Europe formerly, its acrid and stimulating seeds (semen rapistry) was used like mustard seeds. *R. sativus* (Sans. mūlaka ; Ben. mūlā ; Hind. mūlī ; Eng. radish ; Fr. raifort cultivate ; rave ; Ger. Rūbenrettig), a species

with numerous varieties, indigenous to western Asia, China, but now extensively cultivated in all warm regions for its crisp fleshy root. The root is rich in a peculiar nitrogenized juice, considered powerfully antiscorbutic. In Bengal, China and Japan, the root weighing many pounds is eaten fresh when tender, or cooked or pickled. It is an important article of vegetable food in these countries. In Europe a small variety of garden radish, ovoid in shape, weighing nearly half an ounce, is eaten fresh as salad. Of one variety (*oleifera*), the seeds yield a fixed oil, and of another (*R. niger*, black radish regarded by some as a distinct species), the fresh root (*radix recens raphani*) was formerly used in Europe as an expectorant, and the seeds (*semen raphani nigri*) as an aprient, stimulent and diuretic.

148. Mustaka: *Cyperus*, a genus of plants, of the natural order—*Cyperaceæ*, comprising about 650 species very widely distributed, but especially abundant in tropical and subtropical regions. They are annuals or perennials with triangular naked culms usually having an irregular umbel of flattened spikelets. *C. bulbosus*, a species growing in the sandy places on the Coromandel coast, with large starchy root which is cooked and eaten, tasting like potatoes. *C. canescens*, a species found in Bengal and the East Indies where the leaves are used as a remedy for colic and amenorrhea. *C. distachyos* (*souchet en forme de jonc*), a rush found in Bengal where the leaves are used as diuretic and sudorific. *C. pertenuis* (Sans. *nāgara-mustaka* ; Ben. *nāgara-mutā*) a species found in tropical India, whose aromatic root is used as tonic and

stimulant, and yields an oil which is used as a hair-tonic and perfume. *C. rotundus* (Sans. mustaka ; Ben. mutā ; Hind. motā ; Eng. nut-grass), a species, found in tropical India, with irregular rusty-colored tubers of the size of a round nut, and which are tonic and stimulant, and have been used in cholera, and in infusion, in fevers, dysentery and diarrhœa. They have also aromatic, stimulant, diaphoretic and diuretic properties.

149. **Mundi** : *Sphæranthus*, a genus of composite plants, of the family Asteraceæ, tribe Inuleæ and subtribe Plucheineæ. It is characterized by flowers without pappus, the central one bisexual, fertile or sterile, tubular and four-to five-cleft, the outer female and fertile, filiform and minutely 2- to 3-toothed, and by the aggregation of the small flower heads into a dense solitary terminal spherical or ovoid glomerule. There are about 17 species natives of tropics of Asia, Africa and Australia. They are erect villous or glutinous herbs, with divaricate branches, terminated by the pink flower-clusters. The leaves are alternate, toothed and decurrent on the stem. *S. indicus* (syn. *S. hirtus* ; Sans. mahāmundi ; Ben. mahā-srāvani ; Hind. mundi ; East Indian globe-thistle). a common weed found throughout tropical India, in dry cultivated land, and clothed everywhere with soft glandular hairs which give off powerful honey-like odor, The root, seeds and receptacles are considered anthelmintic ; the herb is used as an alterative and pectoral, and externally as an emollient ; and the flowers are used as an alterative, depurative, refrigerant and tonic. The root-bark is used in piles. *S. microcephalus* (Syn. *S. lævigatus* ; Sans. mundi ; Ben. srāvani ; Hind. coti-mundi) a species common in rice-fields in Bengal, East Indies and South

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China. It is used as a tonic, vermifuge and diuretic. *S. suaveolens*, a species found in Egypt, Bengal and East Indies with a strong, pleasantly aromatic odor. The flower is used as a tonic and a alterative.

150. *Murvā* : *Sansevieria*, a genus or monocotyledonous plant of the family—Liliaceæ. It is characterized by a long and slender perianthtube, six filiform filaments, and a free ovary, fixed by a broad base, containing 3 cells and 3 erect ovules. There are about 12 species, natives of tropical Africa and India. They are plants of singular aspect, the true stem reduced to a short and thick root-stock from which spring long, thick, rigid and sometimes cylindrical leaves, which are erect or spreading, resemble stems, and are filled with tough fibers. The flowers are of moderate size or sometimes very long, and are clustered among dry bracts in a dense raceme on a tall and stout unbranched leafless flower-stalk. This genus is the source of the fiber, known as *bowstring hemp*, and its long, tenaceous and silky fiber makes an excellent cordage. *S. lanuginosa* (Tam. marula, Ger. wollige Sansviere), a species found in Malabar, where the juice of the leaves is used in ophthalmia, and that of the root as a salve in arthritis. *S. zeylanica* (Sans. mūrvā; Ben. socha-mukhi; Hind. murhari; Eng. East Indian bow-string hemp), a species found in tropical India, where its root is used in chronic cough and wasting diseases. and the juice of the tender shoots is given to young children to clear their throats of mucus.

151. *Mlechca-phala* : *Coffe*, a genus of the rubiaceous plants, belonging to the tribe Ixoreae, comprising about twenty-five, cultivated extensively for its seed-coffee, in tropical Africa, Asia and America.

The original home of the coffee tree is supposed to be Abyssinia, where in the district called Caffa (from which it is supposed to have derived its name), it is still found wild. All the species of the genus are evergreen shrubs or small trees, with small white and fragrant flowers, having globular or tubular corollæ, and stamens fixed at the top of a small 2-celled berry containing two seeds convex on the outside and flat on the inside where they are marked by a furrow. **C. arabica** (Eng. coffee plant; Fr. cafeier d'Arabie; Ger. arabischer Kaffeebaum), the common coffee plant, and the original source of the coffee in cultivation. It is a small, much-branched, pyramidical tree with whitish bark and slender and horizontally spreading branches. The leaves are opposite and are of a dark-green color on the upper surface, and of elliptical, lance-like form, about six inches long. The flowers are white and fragrant like the orange-tree flowers, and form clusters in the axils of the leaves. The young fruit, at first of a green color, reddens when it ripens, and is an oblong berry. Each berry contains two seeds closely united by their flat sides, which are commonly called coffee-beans or coffee-nibs. When ripe, the berries are gathered, and the outer pulp and the parchment-like covering of the seeds are removed. The Mocha coffee of Yemen in Arabia is reputed the best. But the coffee is principally cultivated in Ceylon, Java, West Indies, Brazil and Central America. **C. bengalensis**, a species growing wild, and cultivated in the mountainous regions of Sylhet and Nepal. The coffee seeds (Sans. mlechca-phala; Ben. kâphi; Hind. kâoā; Fr. cafe; Ger. Kaffee) contain on analysis

about 34 p. c. of cellulose, 12 p. c. of water, 10 to 13 p. c. of fatty matter, 15. 5 p. c. of glucose, 10 p. c. of legumin, 3. 5 p. c. of chlorogenate of potassium and caffeine, a small percentage of oil and mineral substances, and caffetanic and caffeic acids. An empyreumatic oil is developed in roasting the seeds. The action of coffee is that of a cerebral stimulant ; hence its use as an antidote in opium poisoning. It is given with benefit in nervous headache, spasmodic asthma, and whooping cough. It is also used in diarrhea and amenorrhea. It is a good vehicle for administering quinine, the bitterness of which it disguises. It retards tissue waste.

Ya.

152 **Yava : Hordeum hexastichon** (Hind. jou ; Mar., Guj. java ; Eng. barley ; Fr. orge anguleuse ; Ger. sechszeilige Gerste), the grain of grass, belonging to the genus *Hordeum*, that has been cultivated from the earliest times, and can be raised within a great range of climate, from Lapland to north-western India, forming an important article of diet. The Chinese species *H. vulgare* is mentioned in the Chinese books as early as 2500 B. C. All the cultivated species have the same properties. The grain is used in decoction in febrile and inflammatory complaints, in the form of malt, as a demulcent and nutritious liquor. The barley-water, a decoction of the grain is used as demulcent, nutritious refrigerant drink in fevers, in inflammations of the air-passages, and of the alimentary canal.

153. **Yavaksāra** : Potassium carbonate (L. potassii carbonas ; Ben. yavaksāra ; Hind. javākhāra), an alkali prepared from the ashes of burnt green barley-corn. Potassium carbonate is a white crystalline or granular powder, deliquescent, soluble in equal parts of water ; it is employed chiefly externally in the treatment of cutaneous diseases. **Svarggikā** : Sodium carbonate (Ben. sāgi ; Hind. sajji ; Eng. sal soda ; L. sodii carbonas), an inodorous crystalline salt of alkaline taste, soluble in water, and is employed in acid dyspepsia, and externally in the relief of burns, to rheumatic joints, and in scaly diseases of the skin.

154. **Yavānikā** : Carum, a considerable genus of plants, natural order Umbelliferae. The species are glabrous herbs with perennial fusiform edible roots, pinnate or more divided leaves and white or yellow flowers. **C. a jowan** (Sans. yavāni ; Ben. joyain ; Hind. ajvāin ; Eng. a jowan seeds ; Ger. indisches Faltenohr), a small annual herb, cultivated in India for its seeds, which are used as a condiment, digestive stimulant, carminative ; antispasmodic, in dysentery and diarrhea. It supplies most of the thymol which has antiseptic and deodorizing properties. **C. nigrum**, a species with dark seeds growing in India, which is used like C. a jowan. **C. roxburghianum** (syn. Apium involucratum ; Sans. a jamodhā ; Ben. vana-yamāin ; Hind. a jamoda), a wild species found in tropical India, the fruit resembling C. a jowan in properties and uses, but is less aromatic.

Ra.

155. **Rasa : Mercury** (Beng. pārada ; Hind. pārā ; Eng. quicksilver ; Fr. mercure ; Ger. Merkur ; L. hydragyrum), in its pure state, is a shining silver-white metal, liquid at common temperatures, but in native state, it is found combined with tin, antimony, zinc or other metals. The salts of mercury are very poisonous to lower forms of life, and are very convenient and powerful antiseptics. Applied to the skin in concentrate form, most of them are irritating, and some of them are destructive to the tissues. They easily diffuse through the integument. Mercury has a marked influence upon the nervous system, causing debility with tremors. Upon the salivary glands, mercurials have very stimulating effects. The irritation may cause, if long continued, inflammation, ulceration or slough where the patient is in poor physical condition or suffers from some cachexia. Digestive organs are also affected, causing diarrhea and fetid breath. A dark-red rash sometimes occurs when mercury is being taken. A most important field of usefulness for mercurials, is at present, in antiseptic surgery. But the new discoveries of powerful non-irritant, and non-poisonous antiseptics are gradually replacing these time-honored preparations. Internally in syphilitic lesions, mercurial preparations, still seem to be the specific, though they may be applied by fumigation or inunction methods, which are equally efficacious. In Cholera Asiatica, sometimes calomel is given as an intestinal disinfectant.

156. **Rāsna : Vanda**, a genus of epiphytic orchids

of the tribe Vandææ and subtribe Sarantheæ. It is characterized by unbranched loose racemes of rather large flowers with very flat and spreading fleshy sepals and petals, all usually nearly alike and contracted below ; a lip with saccate base ; broad pollen-stalks ; and an unappendaged column. There are about 20 species, natives of India and the Malayan archipelago, with one—*V. hindsii* in tropical Australia. They bear spreading, flat, two-ranked leaves, commonly fleshy or coriaceous, and often notched at the apex—in one species *V. teres*, cylindrical, resembling goose-quill. The handsome short-pedicled flowers are borne on a lateral peduncle. Many species are highly prized in Europe and America for the size, fragrance and beautiful colors of the flower, and cultivated under glass. *V. caerulea*, a species growing on the Banian trees throughout India with bright blue flowers about four inches broad. *V. roxburghii* (syn. *Ærides tessellatum* ; Hind. *rāsana*), a species found on trees in upper and western India, where the flower is used as a pectoral, and the juice of the leaves in diarrhea, dysentery, and as an external application in skin diseases. *V. spathulata*, a species found in Bengal growing on *Terminalia belerica* in Bengal ; its powdered leaves are used in diarrhoea and dysentery, the flower as a pectoral, and the entire orchid. mixed with oil in skin diseases. *V. teres* species found in Sylhet with cylindrical leaves and blood-red white-bordered flowers about 4 inches broad.

157. **Rakta-vija** : *Sapindus*, a genus of dicotyledonous choripetalous trees, type of the family Sapindaceæ, and of the tribe Sapindæ. It is characterized by regular polygamous flowers with 4 or 5 sepals and as many petals, twice as many stamens, solitary ovules, and a fruit of one

or two oblong or globose nutlets without an aril. There are about 11 species, natives of the tropics or the subtropics of both hemispheres, mostly trees, sometimes climbing shrubs. They bear alternate leaves which are undivided or are abruptly pinnate with several entire leaflets or reduced to a single leaflet. The flowers form terminal or axillary racemes or panicles. *S. emarginatus* (Ben. rithā ; Eng. poongam oil plant ; Indian soapnut tree) a species found in tropical India, whose capsules contain saponin and are used in cleaning silk clothes. Medicinally it is used as an expectorant in asthma. The seeds yield a thick viscous oil ; pounded up with water and introduced into the mouth, they are said to cut short the paroxysm of epilepsy. *S. laurifolius*, a species found in Bengal and the East Indies. Its saponaceous berries are used to cleanse fine silk, and medicinally in flatulent colic and abdominal pains. The fragrant leaves are used in baths for painful joints, and the root in gout, rheumatism and paralysis.

158. *Rupya* : Silver (Ben. rupā ; Hind. chāndī ; Fr. argent ; Ger. Silber ; L. argentum) is a white metal, taking a high polish, and not easily affected by acids or by oxygen, although readily tarnished by sulphur. Metallic silver is used in surgery in the form of wire for sutures, and for making cannulæ for tracheotomy, catheters etc. Medicinally it is chiefly used as salt, of which nitrate is the most important. Silver nitrate in weak solution acts as an astringent, and really coagulates the albumin of the tissues and destroys their vitality, acting as a caustic. As an abortive method of treating gonorrhea, it has been much used. But as it is irritant and apt to produce sloughing and stricture of the urethra,

better results are now obtained from the employment of the new silver compounds with albumin (argentamine) or casein (argonin) which destroy the gonococci, but are less irritant to the mucous membrane.

La.

159. **Lavanga** : *Caryophyllus aromaticus* (Syn., *Eugenia caryophyllata* ; Ben. lavanga ; Hind. lomgā ; Mar. lavamga ; Eng. clove ; Fr. girofle ; Ger. Gewürznelken), the unexpanded and dried flower bud of the tree which is a handsome ever-green, indigenous to Moluccus, growing from 15 to 30 feet high with large elliptic smooth leaves, and numerous purplish flowers on jointed stalk. Every part of the plant abounds in the volatile oil for which the flower-buds are prized, and used chiefly as spice, and in medicine for its stimulant and aromatic properties. The oil of clove (Fr. huile essentielle de girofle ; Ger Nelkenöl ; L. oleum caryophylli) is obtained from cloves by distillation with water, and it is very fluid, clear and colorless, if recently prepared, and has the hot aromatic taste of cloves, and is slightly acid, containing carophyllin which may be separated into two oils of different specific gravities. It is used as a corrigent, as an application to painful dental cavities, and for rendering microscopical preparations transparent.

160. **Lichu** : *Nephelium*, a genus of dicotyledonous choripetalous trees of the family—Sapindaceae, type of the tribe Nephelieae, known by the regular cup-shaped fine-toothed calyx, induriscent warty fruit and long

projecting stamens. There are 22 species, mostly of the East Indies, some yielding delicious fruits. They bear axillary or terminal panicles of many small flowers, alternate ever-green abruptly pinnate leaves of a beautiful pink when young, and a roundish fruit with an areolated crust partly filled within by a sweet edible pulp inclosing the bitter shining seed. *N. lappaceum* (Eng. rambutan ; Fr. ramboutan ; Ger. zwillingspblume) a lofty tree cultivated in south China, East Indies, Assam for its fruit which is eaten. It is of an oval form somewhat flattened, about 2 inches long, of a reddish color and covered with soft spines or hairs. The edible part is an aril, which is of pleasant subacid taste, and is used as a refrigerant in fevers. *N. litchi* (Ben. lichu ; Eng. lichi tree ; Ger. litchibaum), a lofty tree indigenous to South China, but cultivated in Bengal for its fruit. It is nearly globular, about an inch and half in diameter with a thin and brittle red-colored shell which is covered with wart-like protuberances. The pulp when fresh is white and nearly transparent, sweet and jelly-like and contains a single shining red-brownish seed. The pulp is given in fevers to quench thirst. The fruit is borne in clusters. *N. longanum* (longan-tree ; dragon's eye ; Ger. longanbaum) a species growing in South China and Assam, the fruit of which is smaller than litchi, quite globular and nearly smooth, and is used like litchi, but is of a less agreeable flavor.

Va.

161. Vaka : *Sesbania*, a genus of leguminous plants of the tribe Galegeæ and subtribe Robinieæ. It is characterized by a beardless style with a small stygma, and a long linear and compressed roundish or four-winged pod which is divided within by cross-partitions between the seeds. There are 15 species widely dispersed through warm regions of both hemispheres. They are herbs, shrubs or small short-lived trees, bearing abruptly pinnate leaves with numerous and entire leaflets, and loose axillary racemes of yellow, white or purplish flowers on slender pedicels. *Sægyptica* (syn. *S. arborescens* ; Eng. *sesban*), a native of Egypt and tropical Asia. It is an elegant, but soft-wooded and short-lived shrub, 6 to 10 feet high. In Sind the leaves are used in constipation and in mania, the bark and seed as an emmenagogue, and the root in snake-bites, In Egypt the seeds are used in hemorrhoids and dysentery. *S. grandiflora* (syn. *Agati grandiflora* ; Ben. *bak*), a soft-wooded and short-lived tree growing nearly 20 to 30 feet in Bengal with yellow, red or purplish flowers. The flowers and young pods are eaten as vegetables, especially with curry. The juice of the flower is used for dimness of vision, and the bark which is bitter and tonic is used in small-pox-

162. Vakula : *Mimusops*, a genus of dicotyledonous sympetalous plants of the family Sapotaceæ, type of the tribe Mimosopeæ. It is characterized by having six or eight segments of the calyx arranged in two series,

the outer one including the inner, which are more slender ; the lobes of the corolla entire and three times as many as the calyx segments. And the six or eight staminodia which are alternate with the same number of stamens. They are trees or rarely shrubs with a milky juice, and usually small white flowers, which are often fragrant, in clusters. About 160 species are known, found throughout the tropics, and several in India and Ceylon yield a heavy and durable timber. *M. elengi* (Ben. bakula ; Fr. mimusope elengi ; Ger. Affengesicht), a large and tall tree found throughout tropical India and East Indies, well-known for its beautiful snow-white fragrant flowers, that bedeck the ground like snow in the spring, and with which children and youths like to make garlands. The bark of the tree is used as an astringent, tonic and febrifuge. An odoriferous water distilled from the flowers is used as a perfume and as a stimulant. The leaves are employed in headache, and a decoction of the bark is used as a gargle in salivation and sore throat, and as an application to swellings. The fruits are edible, and the seeds yield an abundant oil. *M. hexandra* (Tel. palla), a large tree growing in the mountains of the Circars, and whose olive-shaped fruits are eaten. *M. kaki* (Fr. mimusope a feuilles obtuses) a tree largely cultivated in south China and Malabar for its esculent and subacid fruits which are eaten, and which are said to increase appetite. The oil of the seeds is applied in ophthalmia, and is used internally as a vermifuge. The leaves ground and mixed with curcuma and ginger are used as a cataplasm in tumors, and boiled in gingely oil in beriberi. The astringent bark yields a gummy fluid.

163. **Vamsa : Bambusa** (Sans. trina-rāja-the king of the grasses), a genus of arborescent grass of the tribe Bambuseæ, of about 30 species, natives of southern and eastern Asia, one species only being cosmopolitan. This species—the common bamboo (*B. arundinacea*) is nowhere known as indigenous, but is naturalized in many places, and is cultivated extensively in tropical Asia and America. Some of the species are spinose at the joints, others are climbers. The stems attain a height of 50 or even 120 feet with a diameter in the larger species from 4 to 8 inches. There are innumerable uses of the bamboo in the tropics. Young shoots and grains are eaten as food. *B. apous*, a species found in Assam, Burma, and Java, where the young shoots are eaten. *B. arundinacea* (syn. *B. arundinaria*; Ben. bāsa; Eng. bamboo; Fr. bambou commun; Ger. gemeiner Bambos), a species found in Bengal which attains a height of upward 60 feet and a diameter of from 4 to 6 inches at the base. It has a cylindrical, jointed, woody, glabrous and shining stalk which gives off at its nodes numerous branches, clothed with short grayish-green acuminate leaves. The stalks of the female plant contain a peculiar substance (Sans. vamsa-lochana; Eng. tabaxir, tabasheer, bamboo milk, bamboo sugar) consisting of silica with a small quantity of lime and vegetable matter, used as an antispasmodic and astringent, especially in hæmoptysis. A decoction of the leaves is used as an anthelmintic and to facilitate menstruation and the discharge of the lochia. The young shoots are eaten as a vegetable or pickled. The root is given as a specific in eruptive affections. The grain (Sans. vamsa-tandula) is

eaten by poor classes. The plant is said to flower only once in fifteen years, and to die immediately afterward.

B. spinosa, a species growing in Assam and Cochin-China with an erect spinose trunk.

164. **Vasaka** : *Justicia*, a genus of plants of the family Acanthaceæ, the type of the tribe Justiceæ. Its corolla tube is enlarged above and mostly shorter limb. The upper lip is interior in estivation, concave or entire or slightly two-lobed, the lower spreading and three-cleft, with the lobes variously imbricated. The two anther cells are separated, the lower with a small white spur. There are 2 ovules in a cell. The seed is flatly compressed, rarely ovoid, with a marginal hilum, and the funicle hardened into a hooked process. These plants are herbs or shrubs with the leaves entire and the flowers middle-sized or small, colored, white, violet, pink or red and variously disposed. There are about 250 species, belonging to the warmer parts of the globe, many being handsome in cultivation. *J. adhatoda* (Sans. vāsaka ; Eng. Malabar-nut tree ; Fr. carmantine adhatoda, noyer de Ceylon), a shrub found in the eastern coast of India, common in Malabar, where its fruit is used to expel the dead foetus in abortion. The bitterish, slightly aromatic leaves are used as an anthelmintic, and their juice combined with that of fresh ginger, in coughs, asthma and ague. The flowers, leaves and roots, but especially the flowers are employed as antispasmodic in asthma, especially in chronic pulmonary and catarrhal affections unattended with fever. The fresh flowers are applied in ophthalmia. *J. biyalvis*, a bitter species, probably a variety of *J. adhatoda*, found in Malabar, where it is used in gout, asthma, catarrhs and phthisis. *J. gendarussa*, (Tam. kārūnuchi, teo)

a species found in Malabar, East Indies and southern China. distinguished by a disagreeable odor and taste. The root boiled in milk is used in chronic indigestion and in dysentery, and in China in rheumatism and fevers. The tender stalks and leaves are employed in rheumatism ; the leaves in infusion in fevers, and mixed with oil as an application to glandular swellings. *J. procumbens* (Fr. carmantine couchee) a species with linear-lanceolate found on the pasture grounds on the Coromandel Coast ; a round-leaved species found in Central India. Both species are considered a remedy for ophthalmia, the juice of the leaves being squeezed into the eye. *J. tranquebariensis*, a species found in Upper India, the juice of whose leaves is cooling and aperient, and is given to children in smallpox. The bruised leaves are applied to contusions. *J. zeylonensium* (Eng. common Malabar nut) a species found in Ceylon, related to *J. adhatoda*.

165. **Viranga :** *Embelia* a large genus of climbing or creeping myresinaceous shrubs of tropical Africa, Asia and Australia. *E. basaal* a species found in Malabar, the seed of which is used as a vermifuge, the bark of the root in toothache, and a decoction of the leaves as a gargle in sore throat and in making a soothing ointment. *E. ribes* (Syn. *E. indica*, *E. ribesoides* ; Sans. viranga ; Hind. bāyaviram), a large climbing species found in tropical India, whose succulent black berries are made into jellies ; the dried fruit (embeli) is used to adulterate black pepper, and as a remedy for tapeworm and for piles. The fruit contains *embelic* an acid orange-colored crystalline principle which is anthelminthic. *E. tsjeriam-cottam*, a species found in Malabar, the bark of

which is used in aphthae and in indolent ulcers of the mouth and the gums.

166. **Vetasa Calamus**, a very large genus of pinnate-leaved climbing palms, natives of eastern Asia and the adjacent islands. Their leaves are armed with strong reversed thorns, by means of which they often climb the loftiest of trees. The sheathing leaves cover the entire stems and when removed leave a slender jointed polished cane, in some species 200 feet in length. They are the ratan-canes of the commerce, and which have numerous uses. **C. aromaticus asiaticus** (syn. **Acorus indicus**, **Acorus calamus** ; Sans, Ben. **vacha** ; Eng. sweet flag ; Fr. jonc odorant ; Ger. Calmus, Ackerwurtz), a species indigenous to India and China, whose aromatic root-stock is carminative, and is used as a tonic in dyspepsia and colic. It is probable that the Indian and the European species which often go by the same name, are in really varieties, with the only difference that the Indian rhizome is thinner and more aromatic. **C. erectus**, an erect species indigenous to Sylhet, where its astringent seeds are used as a substitute for betel-nut. **C. extensus**, a climbing Sylhet species. **C. rotang** (Sans. **vetasa** ; Ben. **beta**), a species growing in tropical India, the young shoots of which are eaten as a bitter tonic vegetable, and the pulp of the ripe fruit surrounding the seeds as an astringent.

Sa.

167. **Satakumbha** : *Nerium*, a genus of dicotyledonous sympetalous shrubs of the family Apocynaceæ and tribe Echitideæ and type of the subtribe Nerieæ, known by its erect follicles. There are 3 species, natives from Mediterranean to China. They are smooth erect shrubs with rigid narrow-whorled, coriaceous verticillate leaves, large, handsome, fragrant and showy pink, white or whitish flowers, and long straight pod-like fruit filled with woolly seeds. *N. antidysentericum* (syn. *Holarrhena antidysenterica* ; Ben. kurachi ; Hind. kureyā ; pāndrā kudā), a species found in tropical India. Its bitter bark contains an alkaloid. It has tonic and astringent properties, and is used in dysentery and as antiperiodic. The seeds are used as a lithontriptic, anthelmintic, aphrodisiac, in dysentery and in chronic pulmonary affections, and toasted, are given in infusion to allay the vomiting in cholera. Pessaries composed of the bark and seeds are supposed to favour conception, and are used after delivery to give tone to the soft and lacerated parts. *N. odoratum* (syn. *N. odorum* ; Sans. karavira ; Ben. karavi ; Hind. kanera ; Mar. kahnera ; Ger. wohlriechender Oleander ; Eng. sweet-scented oleander), an ever-green shrub indigenous to tropical India, with thick lanceolate leaves which exudes a milky juice when punctured. The plant contains an active poisonous principle, especially in the bark and the kernel of the seed, whose action resembles like that of digitalis. The root contains *neriin*, and a powerful cardiac poison—*oleandrin*. The root-bark, and the leaves

are made into a paste and applied externally in ringworm, boils, eruptions and other cutaneous complaints. *N. oleander* (Eng. common oleander), a species indigenous to Levant, closely allied to *N. odoratum*, and to which it also resembles in therapeutic action.

168. **Satapuspā : Anethum**, a genus of umbelliferous herbs bearing yellow flowers in regularly compound umbels, without involucre or involucl, and having ovate or oblong, laterally compressed fruit with 5—smooth obtuse ribs on each pericarp. *A. graveolens* (syn. *Peucedanum graveolens* ; Ben. sulphā ; Hind. soyā ; Eng. dill-seed ; Fr. persil des marais ; Ger. Gartendill), an herb indigenous to the Mediterranean regions, but now extensively cultivated in India for its highly aromatic fruits (*anethi fructus*), which contain 3 to 4 p. c. of essential oil (*oleum anethi*), which is carminative and stomachic, and which are chiefly used as a condiment, and medicinally in atonic dyspepsia. The leaves moistened with oil, are applied warm to hasten suppuration. *A. trifoliatum* (syn. *Pimpinella anisum* ; Sans. Sans. sālina ; Ben. mouri ; Hind. soph ; Eng. anise ; Fr. anis ; Ger. Anis=Bibernel), an annual herb indigenous to Egypt, but now extensively cultivated in India, for its fruit which contains an essential oil (*oleum anisi*) rich in anethol. It is aromatic stimulant, carminative especially in flatulent colic, and it is reputed also to be a galactagogue. It is chewed with betel-nut, and as a condiment. *A. fœniculum* (syn. *Fœniculum vulgare* ; Sans. methikā ; Ben. methi ; Hind., Mar. Methi ; Eng. fennel ; Fr. fenouil commun ; Ger. gebrauchilcher Fenchel), a species indigenous to western Asia, but cultivated in upper and western India. It is a tall, glaucous herb with decom-pound leaves, yellow flowers, an agreeable odor and sweet

aromatic taste. It is aromatic and carminative, and is much used as a corrigent, especially with senna and rhubarb. Its essential oil (*oleum fœniculi*) has the reputation to be galactagogue. A panmorium (syn. *Fœniculum panmorium*; Sans., Ben. *vanamethi*), a species found in Bengal.

169. Sarapunkha : Tephrosia, a genus of leguminous plants of the tribe Galegeac. It is characterized by racemose flowers with blunt anthers, the banner stamen free at the base, but early united with other stamens at the middle and the style somewhat rigid, incurved and usually at the lip; and by compressed linear or rarely ovate pod with two thin valves, nerve-like sutures and numerous seeds sometimes enlarged by a small strophiole. There are 120 species, widely scattered through warm regions, and especially numerous in Australia. They are herbs or shrubs with odd-pinnate leaves of many leaflets; rarely reduced to three, or even to one, often closely hoary with silken hairs, and remarkable, except in a few Australian species, for their peculiar veins, not netted or branching but extending parallel to each other obliquely from the midrib. The red, purple or white flowers are conspicuously papilionaceous, with the petals borne on claws, the banner roundish and externally silky, the keel incurved; they form racemes which are often leafy at the base and are terminal, opposite the leaves or grouped in the upper axils. Several species yield dye. *T. purpurea* (Sans. *sarapunkha*; Hind, *saraphokā*), a species found in western and southern India, Ceylon, where its juice is applied to the pustular eruptions of the face. The bitter roots which are considered alterative, tonic, laxative anthelminthic and febrifuge, are

used in diarrhœa dyspepsia, and in a wash for the mouth. *T. spinosa*, a shrub found in the eastern coast of India, and which is used as a stomachic. *T. tinctoria*, a species found in Mysore which yields indigo.

170. *Sallaki* : *Boswellia*, a genus of balsamic incense-bearing plants, of the family Balsamaceae of northern Africa and India, distinguished by 3-celled fruit with winged seeds. *B. glabra* (syn. *Canarium balsamiferum* ; Can. *karipai-biru* ; Tam. *janukakukatti*) a species found in southern India, furnishing a gum-resin which is used as an incense, and used in gonorrhea and as an application to ulcers. *B. serrata* (syn. *B. thurifera* ; Hind. *sālai* : *boswellie dentelee* ; Ger. *indischer Weihrauchbaum*), a tree growing in the mountains of Central India and on the Coromandel coast, furnishing fragrant gugul resin (*olibanum*).

171. *Sāla* : *Shorea*, a genus of choripetalous plants of the family Dipterocarpeaceae and tribe Shoreæ. It is characterized by flowers with a very short calyx-tube unchanged in fruit and imbricated calyx-lobes, some or all of which become much enlarged and wing-like and closely invest the hard nut-like fruit. There are about 87 species, natives of tropical India, Malay Archipelago Philippine islands and New Guinea. They are resin-bearing trees, smooth, hairy or scurfy, bearing entire or repand leaves with peculiar parallel veins. The flowers are commonly loosely arranged in axillary and terminal panicles, usually with 5-much twisted petals and numerous stamens of several rows. *S. lard* (Eng. *hog's lard tree*), a species found in Burma, whose fruit produces an oil of the consistence of lard. *S. robusta* (Sans., Ben. *Sāla* ; Hind. *Sāla*), a species indigenous to tropical India, which

affords most extensively timber for multifarious purposes. The wood is of dark-brown colour, hard, coarse-grained and very durable. It yields by tapping a whitish aromatic resin (Sal-dammar) which is applied to chilblains and ulcers, used medicinally like pine-resin, and burnt as an incense.

172. Sami: Prosopis, a genus of leguminous trees and shrubs of the family Mimosaceae and tribe Adenanthereae, characterized by cylindrical spikes and by the pod which is nearly cylindrical, straight, curved or twisted, coriaceous, hard and spongy, indehiscent, and commonly filled with a pulpy or fleshy substance between the seeds. There are about 30 species scattered through tropical and subtropical regions, often prickly, thorny, or both, bearing broad and short twice-pinnate leaves, and small, green or yellow flowers in axillary spikes, rarely shortened into globose heads. Each flower has a bell-shaped calyx, five petals often united below, and separate stamens, their anthers crowned with glands. *P. spicigera* (Sans. Sami; Ben. Sāi; Hind. cikura), a species found throughout India, extending to Persia, whose sickle-shaped fleshy pods which are from 4 to 8 inches long and contain a sweetish mucilaginous pulp, are used as a demulcent and pectoral. From them have been obtained carobin, carobone and carobic acid. The seeds furnish a yellow dye. The bark and leaves are used in tanning, and a manna-like substance exudes from the trunk and branches.

173. Sariva: Hemidesmus, a genus of twining plants of the Asclepiadaceæ, having opposite leaves, cymes of small greenish flowers, and the crown of the corolla consisting of 5 fleshy scales. *H. indicus* (Ben.

ananta-mula ; Hind. dudhi ; Eng. Indian sarsaparilla ; Fr. periploca des Indes ; Ger. Hemidesmuswurzel), a climbing species found throughout India with deep and spreading roots. It is light colored, aromatic and sweet, but slightly acrid. The root occurs in cylindrical furrowed pieces, cracked transversely, brown externally and white within, and has an aromatic odor and taste. It contains hemidesmic acid and a streoptene, not yet fully investigated. It is tonic, alterative, diuretic, diaphoretic and demulcent, and is given in malaria and syphilis for purification of blood. Hemidesmus root is often confounded and substituted for genuine sarsaparilla roots, which come from the species belonging to the genus *Smilax*. **Smilax** is a genus of plants, type of the family Smilacaceæ. It is characterized by diœcious flowers in umbels, with a perianth of six distinct curving segments, the fertile containing several, sometimes, six thread-shaped staminodes, three broad-recurved stigmas, and a three-celled ovary which becomes in fruit a globose berry usually containing but one or two seeds. There are about 200 species, widely scattered through most tropical and subtropical regions. They are usually woody vines from a stout root-stock, bearing alternate two-ranked evergreen leaves with reticulated veins between the three or more prominent nerves. The petioles are persistent at the base, and are often furnished with tendrils by which some species climb to great heights and others mat into densely tangled thickets. *S. glabra*, a species growing in eastern India and Southern China where its large tuberous rhizome is used for sores and syphilis. *S. lanceafolia*, a species found in eastern India and Southern China, where its large tuberous rhizome is used

in rheumatism and sores. *S. medica* (Ger. *medizinische Stechwinde*), a species found on the eastern slopes of the Mexican Andes, yielding Mexican sarsaparilla. *S. officinalis* (Fr. *salsepareille*; Ger. *gebrauchliche Stechwinde*), a species indigenous to tropical South America, cultivated in Jamaica, yielding U. S. Ph. sarsaparilla. *S. ornata*, a species cultivated in Jamaica supplies sarsaparilla of Br. ph. *S. perfoliata*, a species found in eastern India and Cochin China, its roots closely resembling tropical American sarsaparilla, and used like it. Sarsaparilla roots are cylindrical, fleshy, plump when fresh, and more or less wrinkled longitudinally when dried, have a thick amylaceous bark, are often beset with thread-like rootlets of nearly uniform size, and grow from a thick knotty root-stock. The root is easily split in the direction of its length, owing to the longitudinal fibers of which its lignous portion is composed. It displays on cross-section a white central medulla. It has marked odor only in decoction. If chewed for sometime, it leaves an unpleasant acrimonious impression in the mouth and the throat. Four glucosides have been found in it—Parillin, Smila, Saponin and Sarasaponin combined with about 2 p.c. resin and traces of volatile oil. It is used with advantage in syphilis, chronic rheumatism, scrofula and skin-diseases. However its value as an alterative is doubtful.

174. *Sākhota* : *Streblus*, a genus of dicotyledonous apetalous plants, belonging to the family Moraceae, type of the tribe Strebleae. It is characterized by usually dioecious flowers, the male in clustered two-branched heads, the female solitary on the peduncle, the perianth consisting of four widely overlapping segments which.

closely invest the one-celled ovary. As in most of the subtribe, its cotyledons are unequal, and the larger which is very fleshy, incloses the smaller. *S. asper* (Ben. seorā ; Hind. sahorā ; Ger. Schweifbeere), the only species of the genus, a small tree reaching about 30 feet in height, bearing dark-green oval coriaceous two-ranked leaves, indigenous to tropical India, extending to southern China and Andaman Islands. Its root is used in epilepsy and inflammatory swellings, and is applied to boils. The juice is astringent and antiseptic. The Siamese make an excellent preparation out of its bark.

175. *Sālaparnī* : *Desmodium*, a genus of leguminous herbs and shrubs with pinnately trifoliate leaves and flat deeply lobed pods. Each joint of the pod is one-seeded and usually covered with minute-hooked hairs. There are about 150 species, tropical in Asia, extra-tropical in Africa, Australia and America. *D. gyrans*, a small plant found in upper India, distinguished by having spontaneous movements of its leaflets, and is known as telegraph plant. *D. triflorum* (syn. *D. gangeticum* ; Ben. sālapāni ; Hind. sarivana ; Mar. sālavana), a species growing about 2 or 3 feet high throughout tropical India. Externally its juice is applied to abscesses and wounds, and internally in diarrhea. It is reputed also to have diuretic action.

176. *Silājatu* : *Bitumen* (Hind. silajit), a smooth, hard, brittle, black or brownish-black resinous mineral of conchoidal fracture and bituminous odor, which takes fire easily, and burns with a bright but very smoky flame. It is a mixture of asphaltene and petroleum.

177. *Sūrana* : *Amorphophallus*, a genus of araceous plants, indigenous to eastern India and East Indies,

distinguished by a curious mottled gigantic flowering spathe which appears in advance of the large 3-parted compound leaf developing from the tuberous rhizome **A. campanulatus** (Sans. sūrana ; Ben. ola ; Tam. sūrana ; Tel. dolakandā ; Eng. teloogoo potato) a species found in eastern India, where the tuber is eaten after cooking it which dissipates an acrid juice it contains. It is also regarded good in hemorrhoids. When in flower, the flower exales a very fetid odor like that of carrion. **A. giganteus**, a species growing on the Malabar coast, Ceylon and Java, resembling *A. campanulatus*, but has a sessile stigma, and the spathe has a longer peduncle. It contains a volatile acrid principle which is a powerful stimulant. After removing this principle by cutting the tuber into small pieces, soaking it in salt water and boiling it, it is used as food, and which is regarded antispasmodic, especially in asthma. **A. orixensis**, a species found on the Coromandel coast, containing an acrid principle, and when fresh, is used in the form of poultice to hasten suppuration. **A. silvaticus**, a species found in Bengal with a larger tuberous root than that of *Colocasia indica* (Sans. mānakanda ; Ben. mānakachu), containing muciliginous, slightly bitter and acrid starch, and which is eaten as vegetable.

178. **Sephalikā : Nyctanthes**, a genus of fragrant arborescent shrubs belonging to the family Oleaceæ and the tribe Jasmineæ. **N. arbor tristis** (Ben. sephālikā ; Eng. night jasmine ; Fr. arbre triste ; Ger. indische Nacblume) the only species of the genus, indigenous to eastern India, especially Bengal where it is widely cultivated, distinguished by rough opposite ovate leaves and showy flowers in terminal cymes, white with an

orange eye and tube. The flowers open only at night, and in autumn load the air with an exquisite fragrance. The bitter flowers together with the seeds are used as a cardiac tonic ; the root in asthma, cough and phthisis; and the leaves in fevers, rheumatism and sciatica. The flowers afford perfumers' essence, an impermanent orange dye, and the distilled water is used as an eye-wash.

179. Sivi : *Typha*, a genus of monocotyledonous plants, type of the Typhaceæ, characterized by its linear anthers, stalked ovary, and dry indehiscent fruit. There are about 10 species, natives of fresh-water swamps in both tropical and temperate regions. They are smooth herbs with strong creeping root-stocks from which grow erect unbranched and often tall and robust stems with a submerged base. The leaves are chiefly radical, long and linear, spongy and at first somewhat fleshy and watery. The monœcious flowers from a cylindrical terminal spadix, the upper part of which is staminate deciduous ; both parts are partly covered in the bud by very perishable thin spathaceous bracts. The long-stalked minute fruit is produced in great abundance, over 60,000 to the average spike in the common species ; each fruit contains a single seed and is surrounded near the base by 20 to 40 long slender white hairs which expand at maturity, aiding in despersion by the wind. The plant usually reaches from 5 to 9 feet high. *T. angustifolia* (Ben. hoglāpatā ; small bulrush, renee plant Fr. chandelle quenouille), a species found in the salty marshes of eastern Bengal, distinguished with a single-grained pollen, and showing distinct interval between the male and the female division of the spike. The

leaves are woven into baskets, and the roots are used as diuretic and in dysentery. *T. elephantina* (Eng. elephant grass), a species found in the marshy places of Assam and Burma, which the elephants are fond of eating. *T. latifolia* (Ben. hogal-pātā ; Eng. marsh-beetle ; Fr. massette ; Ger. breitblättriger Rohrkolben), a species growing in the freshwater marshes of eastern Bengal. Its handsome dark rusty-brown fertile part of the spike is usually from 5 to 8 inches long. The abundant mealy pollen (hogala-guri) is mixed with sugar and made into candies and sweetmeats, having delicious flavor and taste. The powdered flowers have been made into poultices, and the farinaceous root-stocks are considered astringent, diuretic and antiscorbutic. The long leaves are woven into mats and baskets, but when dry they are very inflammable.

180. Saileya : Parmelia, a genus of lichens of the family Parmeliaceæ. The thallus is imbricate-foliaceous, appressed or rarely ascendant, membranaceous, sparingly fibrillose beneath. The apothecia are scutelliform, subpediculate with mostly thin disk and colorless hypothecium. The species are widely distributed and are numerous. *P. aquila*, a species found on the high mountain rocks of the Himalayas. *P. parietina* (Hind. paththar kā phul Eng. yellow lichen ; Fr. parmelia des murs ; Ger. Wand-schildflechte), a species found on trees, especially on old planks, walls and on rocks. It contains a yellow dye-stuff, gum, extractive and chrysophanic acid. It is bitter and febrifuge, and formerly it was used as tonic in diarrhoea and dysentery.

181. Syonaka : Oroxyllum indicum (Ben. sondāla ; Hind. sonāpāthā), a small tree growing at the foot-hills

of tropical India, about 30 to 35 feet high. Its root is used in dropsy and as vulnerary, and the leaves are reputed emollient.

182. **Slesmāri** : *Thea assamica* (Ben. chā-gāca : Eng. tea-plant), a shrub from 3 to 6 feet high with leaves from 4 to 8 inches long, and from one and half to two and half inches broad, and tapering toward both ends. The flowers are white and one and one-fourth inch broad. The cultivated plant is of more contracted habit, with smaller, more obtuse and leathery leaves. The plant is found in wild state in upper Assam, and is considered the parent species of all cultivated varieties of the tea plant. The dried leaves (Ben. chā ; Eng. tea ; Fr. the Ger. Thee) of the tea plants contain a volatile citron-yellow oil (from 0.6 to 1 p. c. or more according to the age of the leaf), tannin from 0.43 to 5 p. c., theine—the activating alkaloid combined with tannic acid, boheic acid, quercetin, quercitannic, gallic and oxalic acids, gum, wax, resin, coloring matter, etc. It is astringent, especially if long infused, and gently exhilarating. Its excessive use is easily apt to produce dyspepsia and nervousness. Tea is often aromatized with sweet-scented flowers or leaves of rose, jasmine etc.

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183. **Samudraphena** : *Os sepie* (Ben. Samudraphenā ; Eng. cuttlebone ; Ger. Kuttelfishbeim), the friable calcareous bone of a dibranchiate cephalopodous mollusk with a depressed body inclosed in a sac. The shorter

arms or feet. of the cuttle-fish eight in number, covered with four rows of raised disks or suckers, are arranged around the mouth, and from the midst of them extend two long tentacles, also found with disks. These members, the animal uses for walking, for attaching itself to objects and for seizing its prey. A tube or funnel exists below the head and leads from the gills through which the waters admitted to these organs is expelled; and the creature by ejecting the water with force can dart backward with amazing velocity. It has also the power of ejecting a black ink-like fluid from a bag or sac as to darken the water and conceal itself from pursuit. In a sac on the back of the mantle, there is a light, porous, oblong-oval calcareous shell formed of thin plates. When the animal dyes, and the fleshy part is disintegrated and released, the bony frame floats on the surface, which the ancients believed to be hardened sea-foam. It has saline taste and feeble sea-odor. Finely-powdered it is used as antacid, in goitre and in tooth-powders. It is also used for polishing wood, paint and varnish. It is hung on the bird-cage for its slight saline taste is agreeable to the birds, and gently stimulating to their appetite, as well as affording lime for their shells.

184. *Sarsapa* : *Sinapis*, a small genus of brassiaceous herbs, distinguished from *Brassica*, by its spreading petals, and sessile beaked and cylindrical or angled pods with globose seeds. The seeds are laxative, stimulant, emetic and rubefacient. *S. alba* (Sans. Siddhārthaka; Ben. syeta-sarsapa or sarisā; Hind. saphed sarsom; Eng. white mustard; Fr. moutarde blanche; Ger. weisser senf) a species indigenous to western Asia, probably, but now cultivated throughout India. The yellowish seeds

larger than black mustard seeds and having a testa which contains a mucilagenous substance, have a composition like that of black mustard, but in place of sinigrin contain sinalbin, which in presence of water is acted on by myrosin (in which they are richer than black mustard) and splits up into acrinyl-sulphocyanate, sinapine sulphate and sugar. Hence white mustard yields no volatile oil. But it yields a good edible oil, though not pungent. Its tender shoots and leaves are eaten as vegetable. *S. glauca* (Sans. rakta-sarsapa ; Ben. sarisa ; Hind. sarsom) a species extensively cultivated throughout tropical India for the rubefacient oil derived from the seeds. The oil is used in cooking, and in skin diseases. The tender leaves are eaten. *S. nigra* (Sans. rāji ; Ben. krsna-rāi ; Hind. rāi ; Eng. black mustard ; Fr. moutarde noire ; Ger. schwarzer Senf), a species widely cultivated, bearing numerous, smooth, erect pods, containing spherical or slightly oval, minutely pitted, blackish-brown or reddish-brown pungent seeds. The seeds contain cellulose sulphur, nitrogen, albuminoids, and over 20 p.c. of a greenish-yellow fixed oil consisting of the glyceric compounds of stearic, oleic and erucic acids. The oil (Ben. sarisār taila) has a strong pungent taste, and is used in cooking and skin diseases. The flower is used as an emetic, especially in narcotic poisoning, and as a counter-irritant poultice.

185. *Sinduvāra* : *Vitex*, a genus of plants of the family Verbenaceæ, type of the tribe Viticeæ. It is characterized by medium-sized flowers, the corolla with a short tube and a very oblique five-cleft or two lipped limb (its forward lobe larger) by four usually asserted stamens, and by a drupaceous fruit with single

four-celled nutlet. There are about 100 species, widely dispersed, throughout warm regions. They are trees or shrubs, bearing opposite leaves, which are commonly composed of three to seven digitate entire or toothed thin or coriaceous leaflets. The flowers are white, blue, violet or yellowish and form cymes which are loose or widely forking or short, dense, or sometimes almost contracted into a head. The genus is somewhat aromatic. *V. latifolia*, a tree found in Bengal and the East Indies where its leaves are used for venomous bites, and the bark and the root in diarrhea and dysentery. *V. negundo* (Ben. nishindā ; Hind. siharu ; Mar. linkur ; Eng. chaste tree ; Fr. gattilier incise), a five-leaved tree found in India and East Indies. Its aromatic leaves are used as a topical application in rheumatism, sprains, and in decoction as a bath for women after delivery. The bitter root and the fruits are anthelmintic. *V. pinnata*, a species found in Ceylon, where its flowers are used to aromatize tea. *V. pubescens*, (Eng. tree vitex), a species growing in Bengal and East Indies about 50 feet high. *V. rheedii*, a Malabar tree, where its mildly aromatic bark is used in abdominal complaints, and with fragrant leaves as an emmenagogue and in after-pains. The young branches are used topically in rheumatism and gout. *V. trifolia*, (Ben. nisindā ; Eng. Indian privet, wild pepper), a three-leaved tree found in eastern India, having the medicinal property of *V. negunda* in greater degree. The young shoots and leaves are powerful discutient. The powdered leaves are used as febrifuge, and the root as an anodyne application, and the fruit as an emmenagogue.

186. *Sinduri* : *Bixa*, a genus of dicotyledonous trees,

constituting the family Bixaceæ. It is characterized by large cordate-ovate leaves, showy pinkish flowers in terminal panicles and prickly capsules. *B orellana* (Ben. latkanā; Hind. senduriā; Mar. semdri; Eng. arnotto; Fr. rocou; Ger. achter Orleanbaum), a small tree growing in tropical America, (very common in Jamaica), India, Ceylon and Senegal. The fruit is a cordate (sometimes lanceolate) capsule dehiscing by two halves and contain from eight to ten obovoid seeds surrounded by three envelopes, the outermost of which is pulpy and contains a yellow coloring matter which is employed as a dye. This pulp is both astringent and purgative, and has been used as a remedy for dysentery. The seeds are held to have astringent, cordian and antipyretic properties. The reddish or the reddish-yellow waxy pulp which covers the seeds is dissolved in water, then dried to the consistency of putty and made up into rolls or folded in leaves, or dried still more and made into cakes. It is employed as a dye for silken, woolen or cotton stuffs, as an auxiliary in giving a deeper shade to simple yellows, and also as a coloring ingredient for butter, varnishes and lacqers.

187. *Sugandha-vāṭā*: *Pavonia*, a genus of herbs and shrubs of the family Malvaceæ and the tribe Ureneæ. having from 5 to 8 leaf-like or bristle-like bractlets and the carpels generally with one to three awns. There are about 70 species, mainly in South America, with a few in tropical Africa, Asia and Australia. They are usually wooly or bristly-hairy, the leaves often angled or lobed, and flowers of various colors, scattered or seldom in dense heads. *P. odorata* (Ben. sugandha-vāṭā; Hind. bālā; Mar. bāllā; Fr. pavonia odorante), a fragrant species

found throughout tropical India, whose leaves and young shoots are used as an emollient, and the root in infusion as a drink in fevers. *P. zeylonica*, a species found in Ceylon and the Andaman Islands. It is used like *P. odorata*.

188. Sūryyāvartā : Heliotropium, a genus of plants of the family Baraginaceæ and tribe Heliotropiæ. It is distinguished by the form of its corolla, which is that of a salver or funnel and generally small, and by its dry fruit which commonly separates into 4 nutlets. The genus includes about 220 species of herbs and shrubs, with white or lilac flowers, inhabiting the warmer and temperate regions of both hemispheres. *H. indicum* (syn. *H. hispidum*; Ben. sūrya-mukhī; Hind. sūraj-mukhī; Mar. sūrya-phula; Tel. sūrya-kānthipū; Eng. Indian heliotrope, erysipelas plant; Fr. heliotrope des Indes), an astringent and antiphlogostic species growing throughout the tropics, especially in India, where its pressed juice is used in gum-boils, pimples, ophthalmia and venomous bites.

189. Suvarna : Gold (Ben. svarna, sonā; Hind. sonā; Guj. sonu; Fr. or; Ger. geld; L. aurum) a metallic element known from the earliest times. It is found in nature in both the combined and the free state, in the latter case usually associated with silver and also with other metals. It is a soft, bright-yellow, lustrous substance, and is exceedingly tenacious, malleable and ductile. It is very heavy, and is not oxidized at any temperature by contact with water or oxygen, and is not attacked by any acids except selenic acid and a mixture which like nitro-hydrochloric acid, contains nascent chlorine. It is also attacked by alkalis. It is employed in medicine in the

form of gold ashes and also as the base of various salts, as an alterative, aphrodisiac, antisyphilitic, antiscorbutic, and in phthisis and urinary diseases.

190. Seva : Anona, a genus of trees or shrubs, type of the family Anonaceæ, distinguished by following characteristics : the buds are naked ; the leaves are alternate, exstipulate and entire ; the flowers are axillary ; there are 3 sepals and 6 petals, hypogynous and usually vulvate in aestivation ; there are numerous stamens with short filament and enlarged connectile, springing from a large receptacle ; the embryo is surrounded by ruminated albumen. There are about 50 species, natives of tropical America, but many of them are now cultivated throughout the tropics, especially in eastern India, for their fruits.

A. muricata (Eng. sour-sop ; Ger. weichstachliger Flaschenbaum), a medium-sized tree indigenous to West Indies, but cultivated in eastern India. It bears an oblong-cordate or rounded fruit, 10 to 12 inches long, having greenish or yellow reticulate rind, covered with short recurved soft bristles. The ripe fruit has an agreeable aroma, and pleasant slightly acid pulp, which is much esteemed, and is also employed in the preparation of refrigerant drink in fevers. When unripe, it is very astringent, and is employed in intestinal atony and in scrobutic conditions. The bark of the tree is used as an astringent, and the bark of the root is given in ptomaine-poisoning, especially after putrid fish-eating. The leaf is used as an anthelmintic and externally as a suppurant.

A. reticulata (Eng. sweet-sop ; Fr. petit corossol ; Ger. Rahmapfel), a species indigenous to West Indies, but now cultivated in the East Indies and Bengal. It bears an ovate-rounded fruit (Ben. lonā phala), of the size of a

man's fist, having the surface divided into rounded or pentagonal depressed areas. When ripe it has a thick, sweet luscious pulp. Unripe and dried, the fruit is used as an astringent in diarrhea and dysentery. The seeds are also very astringent, containing much tannic acid, but the kernel of the seeds is highly poisonous. The leaf is used as an anthelmintic, and externally as a suppurant. **A. squamosa** (Ben. ātā gāc ; Eng. custard apple ; Fr. attier ; Ger. Zuckerapfel), a tree indigenous to West Indies, now cultivated throughout tropical India, growing from 15 to 20 feet in height. It bears a rounded ovate fruit (Ben. ātā phala), covered with imbricate scales. The pulp of the fruit when ripe has a very agreeable taste and aroma, and medicinally it is employed in preparing cooling drink in fevers. When unripe, the astringent fruit is given in diarrhea, dysentery and atonic dyspepsia. The astringent bark is used as tonic, and the leaves which have a disagreeable odor are used in fomentations.

191. **Somavalli**: **Hydrocotyle**, a genus of the plants of the family *Apiaceæ*, type of the tribe *Hydrocotyleæ*, having the fruit much compressed, the calyx-teeth minute or obsolete, the petals concave, valvate or imbricate, and the umbels simple. About 70 species are known widely distributed over the warm and temperate regions. They are usually small herbs creeping and rooting at the nodes, commonly growing in moist places, on the edge of marsh, lakes and rivulets. It has round peltate leaves and small simple umbels of pale-pink flowers. **H. asiatica** (Sans. Ben. brāhmi ; Hind. brahmi ; Tam. bimi ; Eng. Asiatic water pennywort ; Ger. asiatischer Wassernabel), a species

growing in moist places throughout India and Africa. The leaves are toasted and given in infusion in the bowel complaints of children. The leaves and tender shoots are cooked and eaten as vegetable, and are regarded as nervant, and valuable in cutaneous diseases. The juice of the leaves is regarded as diuretic, and is externally applied in bruises and in cutaneous affections. The legume is eaten, and has been used in syphilitic ulcers and scrofula. *H. rotundi folia* (Sans. manduka-parṇi; Ben. gimā sāka; Hind. khulkhuri; Tam. ballari-keri), a species common in India, and sometimes substituted in medicine for *H. asiatica*, from which it may be distinguished by its much smaller fruits,

192. *Soma* : *Eleusine*, a genus of grass belonging to the tribe Chlorideæ having several linear spikes digitate at the summit of the culm. There are six species, natives of the warmer parts of the globe. *E. coracana* (vedic soma plant?; Sans. soma; Zend hāomā; Hind. rājī, mand, muroā), one of the most prolific grasses of south-eastern Asia. A fermented liquor is made from its seeds. In Tibet a light beer is made of the grains. In northern and north-western Himalayas, its bitterish ground flour is the staple food of the poorer classes. *E. indica* (Eng. crab-grass), a species of annual grass, indigenous to upper and western India, now extensively cultivated in all warm regions, as it is good for soiling, grazing and for hay. *E. stricta*, a species cultivated in eastern Asia for its seeds with which fermented liquors are made. *E. tocusso*, an Abyssinian species whose seeds are used in the preparation of fermented liquor and a beer.

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193. **Haridrā : Curcuma**, a genus of plants of the family Zinziberaceæ distinguished by perennial tuberous roots, annual stems and the flowers in spikes with concave bracts. **C. amada** (Ben. ama-ādā ; Eng. mango-ginger), a species found in Bengal, whose rhizome has a pungent taste like that of ginger, and is used as a carminative and stomachic. **C. angustifolia** (East Indian arrowroot plant ; Ger. schmalblättrige Kurkume), a species found in Bengal and East Indies having oblong bulbs with pale, oblong, pendulous starchy tubers which furnish an excellent arrowroot. **C. aromatica** (syn. **C. zedoarie** ; Eng. wild turmeric ; Fr. zedoire ronde Ben. karpura hari) an ornamental plant abounding in the Travancore forests. The root has aromatic and tonic properties, and is also used as a perfume. **C. leu-corrhiza**, a species found in eastern India and East Indies, furnishing a kind of arrowroot. **C. longa** (Sans. haridrā ; Ben. halaida ; Hind. , Mah. haldi ; Eng. turmeric ; Fr. curcuma long), a species found in tropical India and the East Indies whose rhizome is a cordial and stomachic. Its yellow coloring matter is used in pickles and curry powder. The juice of the fresh rhizome is anthelmintic and is applied to recent wounds, bruises and leech-bites. **C. zerumbet** (Sans. sunthi ; Ben. sutha), a species found in tropical India, whose root is used medicinally as tonic and carminative, and it is said to have virtues in nephritic complaints.

194. **Hingu : Ferula**, an umbelliferous genus of

about 50 species, distributed from the Mediterranean region to central and southern Asia and to tropical Africa, and very nearly allied to *Peucedanum*. They are generally tall, coarse plants with dissected and deeply divided leaves, compound umbels of yellow flowers and membranous winged fruit with three threadlike ridges. They yield various medicinal gum-resins as galbanum and asafetida. **F. alliacea** (Sans. hingu; Ben. hing; Hind. hīmg) a species found in Persia, China and northern India, whose root yields a sort of asafetida (Sans. Hingu). The gum resin extracted from the root, when fresh is white, but gradually becomes yellow and at last dark-brown. It occurs in commerce in the form of gum-like masses streaked with white, having an extremely disagreeable alliaceous odor and a sharp biting. It dissolves readily in alcohol, and forms a milky mixture with water. It contains about 65 p. c. of resin, 19.4 p. c. of soluble gum, 11.2 of bassorin, 3.6 p. c. of volatile oil, and 0.3 p. c. of calcium malate. It is used as a condiment, carminative, antispasmodic, aphrodisiac and hypnotic. **F. narthex** (Fr. ferule asafœtida; Ger. stinkendes Steckenkraut), a species indigenous to Persia and Afghanistan, yielding asafœtida. The young plant is said to be edible. **F. suaveolens**, a species found in Afghanistan, whose scented root (Hind. sumbul) is used medicinally as a substitute of asafœtida, and which contains a gum-resin.

16a. **Anārasa** : *Ananas sativus* (Ben. ānarasa ; Hind. ānānā ; Eng. pine-apple ; Fr. anānas cultive), a bromeliaceous species, indigenous to South America, but now extensively cultivated in all tropical countries for its much prized fruit. It is a biennial plant with stiff spinous leaves, which are about 3 feet long and yield a strong fiber, used in making cords or woven into fine fabrics. The short stem rises from the cluster of rigid recurved leaves. The axis extends beyond the single fruit in a tuft of short leaves called the crown. The compound conical fruit (pineapple) borne on a short stalk rising from the center of the plant consisting matured spike or head of flowers, all parts of which flowers, bracts and axis are consolidated in one succulent mass, sometimes weighing as much as 12 pounds. The edible succulent fleshy parts under the tough persistent floral bracts are deliciously acidulated, when ripe. It is refrigerant, refreshing, aperient, and is reputed to contain a ferment which helps in the digestion of albuminous substances. Unripe, it is acid and styptic, and is said to be a powerful diuretic and anthelmintic, and to be abortifacient.

96a. **Tāmra-kuta** : *Nicotiana*, a genus of narcotic plants of the family Solanaceæ, and the tribe Cestreæ, known by the many-seeded capsule and cleft-calyx. The species are estimated at about 140, mostly American with a few in Australia and the Pacific Islands. They are mainly herbs, a few shrubs, and one a small tree. They have undivided leaves and white-yellowish, greenish or

or purplish flowers in panicles or racemes. *N. fruticosa* (Fr. nicotine arbrisseau), a shrubby tobacco plant indigenous to China, by some considered a variety of *N. tabacum*. *N. persica*, a species found in Shiraj, supplying commercial tobacco. *N. tabacum* (Ben. tāmāk ; Eng. tobacco ; Fr. tabac ; Ger. gemeiner Tabac), a species indigenous to tropical America, now widely cultivated in both hemispheres. It has a simple unbranched stem, sometimes 6 feet high, bearing at the top a panicle of pink flowers. The leaves are alternate, simple, oblong, lanceolate, and at the lower part of the stem somewhat stalked and of larger size, sometimes 2 feet long. The herbaceous parts of the plant are covered with soft hairs exuding a glutinous fluid. When fresh, the leaves have a very narcotic odor and a bitter nauseous taste. The dried leaves (tobacco) have a peculiar penetrating odor wanting in the fresh plant. They contain nicotine, nicotianine, a very small percentage of essential oil, malic, citric, acetic, oxalic and pectic acids, and a small proportion of sugar, cellulose, albuminoids, and of fats and other bodies extractable by ether. Tobacco-smoke is very complex in composition, but if nicotine (which does not occur according to Vohl) is excepted, the only constituents found in appreciable quantities are numerous basic substances of the picolinic series. A dark-brown, acrid, highly poisonous empyreumatic oil is obtained from tobacco by distillation. Tobacco used in moderation, causes in those accustomed to its use a gentle exhilaration of a state of quietude and repose. Its excessive use produces dyspepsia, general anemia, amblyopia from neuritis and cardiac distress. Its active principle—nicotine is a powerful sedative poison which has a depressant action on the motor-nerve trunks.

Tobacco was formerly much used as a relaxant, but its use is attended with danger, as its poisonous principle is easily absorbed by the skin.

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